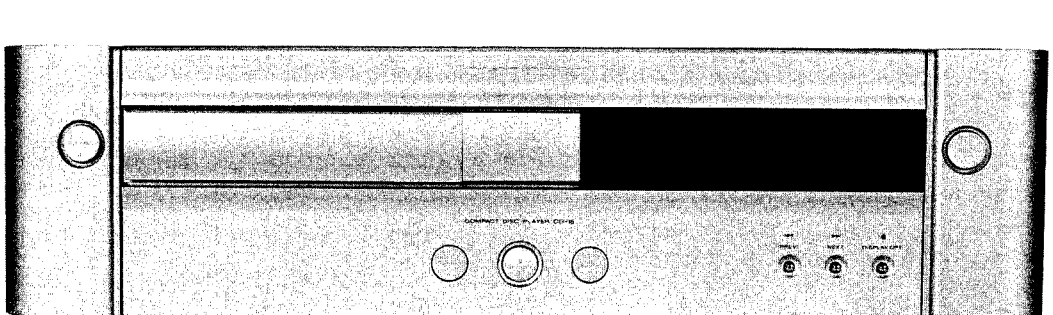
Service Manual

74 CD15/00G

Compact disc player



COMPACT disc DIGITAL AUDIO

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marantz®

model CD-15

First issue : 1993

4822 725 51017

PCS 70551

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, MARANTZ company has created the ultimate in stereo sound. Only **original MARANTZ parts** can insure that your MARANTZ product will continue to perform to the specifications for which it is famous.

Parts for your MARANTZ equipment are generally available at our National Marantz Subsidiary or Agent.

MARANTZ EUROPE B.V.
P.O. Box 80002
Building SFF 2
5600 JB Eindhoven
The Netherlands
Phone : +31-40-732241
Fax : +31-40-735578

ORDERING PARTS

Parts can be ordered either by mail or by telex. In both cases, the correct part number has to be specified. The following information must be supplied to eliminate delays in processing your order:

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which the part is required
5. Way of shipment
6. Signature: any order form or telex must be signed, otherwise such part order will be considered as null and void.

ADDRESSES

AUSTRALIA
MARANTZ AUSTRALIA
Figtree Drive
Australia Centre
Homebush, NSW 2140
AUSTRALIA

AUSTRIA
MARANTZ
Hietzinger Kai 137a
1130 Wien
Austria

BELGIUM
MARANTZ EUROPE B.V.
Div. Benelux
P.O.Box 80002
Building SFF 2
5600 JB Eindhoven
The Netherlands

CHILE
MARANTZ DIVISION OF
PHILIPS S.A.
Av.Santa Maria 0760
Casilla 2687
Santiago
Chile

DENMARK
MARANTZ
Horsvinget 5
2630 Tastrup
Denmark

FINLAND
MARANTZ
Kuortanegatan 1
00520
Helsingfors 52
Finland

FRANCE
MARANTZ FRANCE
4 Rue Bernard Palissy
92600 Asnières
France

GERMANY
MARANTZ GERMANY GmbH
Kleine Heide 12
Postfach 4802
Halle-Westfalen
Germany

GREAT BRITAIN
MARANTZ HiFi UK Ltd.
Kingsbridge House
Padbury Oaks
575-583 Bath Road
Longford Middlesex UB7 OEH,
U.K.

GREECE
ADAMCO ELECTR. SA
P.O.Box 21025
Hippocratus Str. 188
Athens 11471
Greece

ITALY
MARANTZ ITALIANA SPA
Piazza IV Novembre 3
20124 Milano
Italy

JAPAN
MARANTZ JAPAN INC.
35-1, 7-chome, Sagamiono
Sagamihara-shi, Kanagawa
Japan

KUWAIT
AL ALAMIAH ELECTRONICS
P.O.Box 8196
Salmiah
22052 Kuwait

NETHERLANDS
MARANTZ EUROPE B.V.
Div. Benelux
P.O.Box 80002
Building SFF 2
5600 JB Eindhoven
The Netherlands

NORWAY
MARANTZ
Postboks 7034
Assiden
3007 Drammen
Norway

PORTUGAL
COREL
Av. da Liberdade
211-2 Esq.
1200 Lisboa
Portugal

SAUDI ARABIA
AL ALAMIAH ELECTRONICS
P.O.Box 5954
University Street
Riyadh 11432
Saudi Arabia

SOUTH AFRICA
MARANTZ S.A.
10 Bond Street
Randburg 2194
P.O. Box 7703
Johannesburg 2000
South Africa

SPAIN
MARANTZ SPAIN
Martinez Villergas 2
Apartado 2065
Madrid 28027
Spain

SWEDEN
MARANTZ
Box 1324
17125 Solna
Sweden

SWITZERLAND
MARANTZ SWITZERLAND
Postfach
8010 Zürich-Müllingen
Switzerland

TRADING
MARANTZ TRADING
P.O.Box 20008
Building SFF 2
5600 JB Eindhoven
The Netherlands

All of the above locations are fully equipped to take care of your total service needs or can advice you. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please contact the nearest facility for the necessary assistance.

In case of difficulties, do not hesitate to contact the Technical Department at above mentioned address.

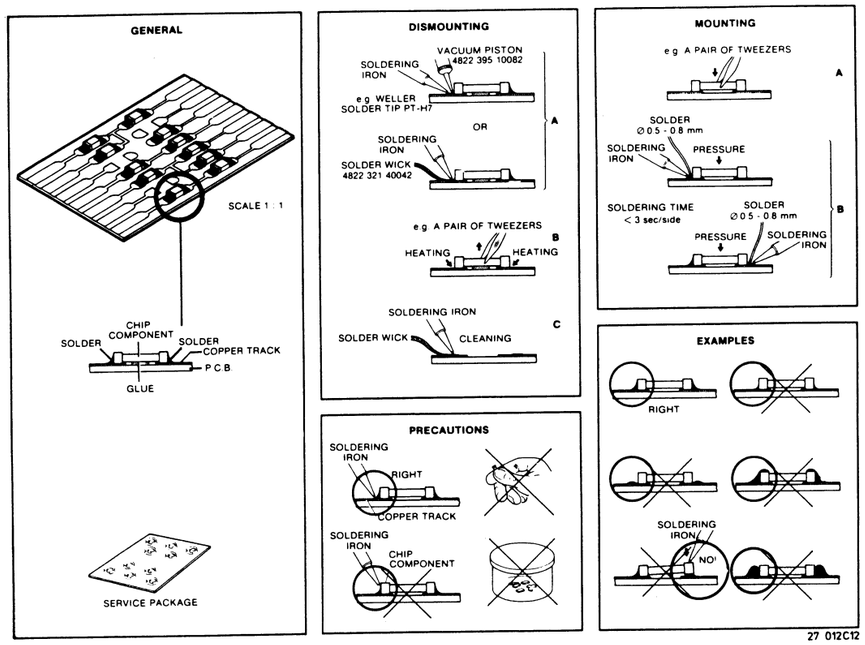
1. SERVICING HINTS

In the set chip components have been applied.
For disassembly and assembly of chip components see the figure below.

CLASS 1
LASER PRODUCT
3122 110 03420

SERVICE TOOLS

Audio signals disc	4822 397 30184
Disc without errors (test disc 5) + disc with DO errors, black spots and fingerprints (test disc 5A)	4822 397 30096
Disc 65 min 1 kHz without pause	4822 397 30155
Max. diameter disc(58.0 mm)	4822 397 60141
Torx screwdrivers	
Set (straight)	4822 395 50145
Set (square)	4822 395 50132
13th order filter	4822 395 30204
Service cable (4p)	4822 321 21284
Service flexfoil (14p)	4822 322 40066
Service connector (14p)	4822 267 50676
Green LED CQY G11	5322 130 32182
Insulation cover	4822 444 60655



GB WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

ESD

F ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

D WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD).
Unsorgiältige Behandlung bei der Reparatur kann die Lebensdauer drastisch vermindern.
Sorgen sie dafür, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

NL WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

I AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

2. TECHNICAL SPECIFICATIONS

Audio Characteristics
- Channels ..... 2 channels
- D/A conversion ..... 1-bit linear/channel

Frequency Characteristics
- Line output jack ..... 20 to 20,000 Hz, ± 0.2 dB
- BALANCED output jack 20 to 20,000 Hz, ± 0.2 dB
- Dynamic range ..... 97.5 dB
- S/N ratio ..... 110 dB
- Channel separation ..... 100 dB (50 ~ 20 kHz)
- THD ..... 0.00135 % (1kHz)
- Wow & flutter ..... Precision of quartz
- Analog output jacks
  - Line output jacks ..... Output level 2 V RMS
  - ..... Output impedance 150 ohms
  - Matching load impedance ..... 10 kohms or more
  - BALANCED output jack ..... Output level 2.4 V RMS
  - ..... Output impedance 100 ohms
  - Matching load impedance ..... Balanced 600 ohms
  - ..... Unbalanced 600 ohms to 50 k ohms
- Digital output ..... Pin jack, 0.5 Vp-p/75 ohms

Optical Readout System
- Laser ..... AlGsAs semiconductor
- Wavelength ..... 780 nm

Signal System
- Sampling frequency ..... 44.1 kHz
- Quantization ..... 16-bit linear/channel
- Error correction ..... Cross-interleave reed solomon code (CIRC), Bitstream D/A conversion

Power Supply
- Power Requirements ..... 220/240 V AC 50/60 Hz
- Power Consumption ..... 20 W

Cabinet, etc.
- Dimensions
  - Width ..... 454 mm
  - Height ..... 118 mm
  - Depth ..... 333 mm
- Weight ..... Approx. 16.8 kg
- Operating temperatures ..... + 5 °C ~ + 35 °C
- Operating humidity ..... 5 % ~ 65 % (without Dew)

Accessories
- Remote control unit (RC-15CD) 1
  - Dimensions (W x H x D) ..... 44 x 17.5 x 239 mm
  - Weight (without batteries) ..... 200 g
- R03 Batteries 2
- Stereo audio cable with RCA pins ..... 1 Pair
- Digital signal cable with RCA pins 1
- AC Adapter 1

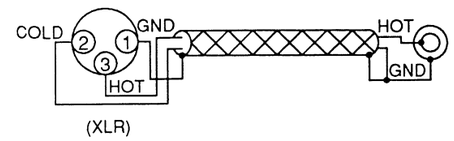
* Improvement may result in changes in specifications and design without notice.

3. NOTES ON BALANCED OUTPUTS CONNECTORS

The BALANCED output connectors uses XLR connectors.

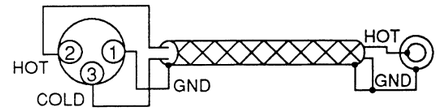
There are two types professional-type internal wiring methods for XLR connectors.

1. ***USA method*** (Pin 2= COLD, Pin 3=HOT)



(XLR)

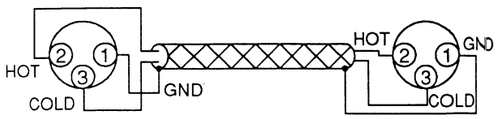
2. ***Europe method*** (Pin 2= HOT, Pin 3=COLD)



(XLR)

The models use the USA method described in 1 above.

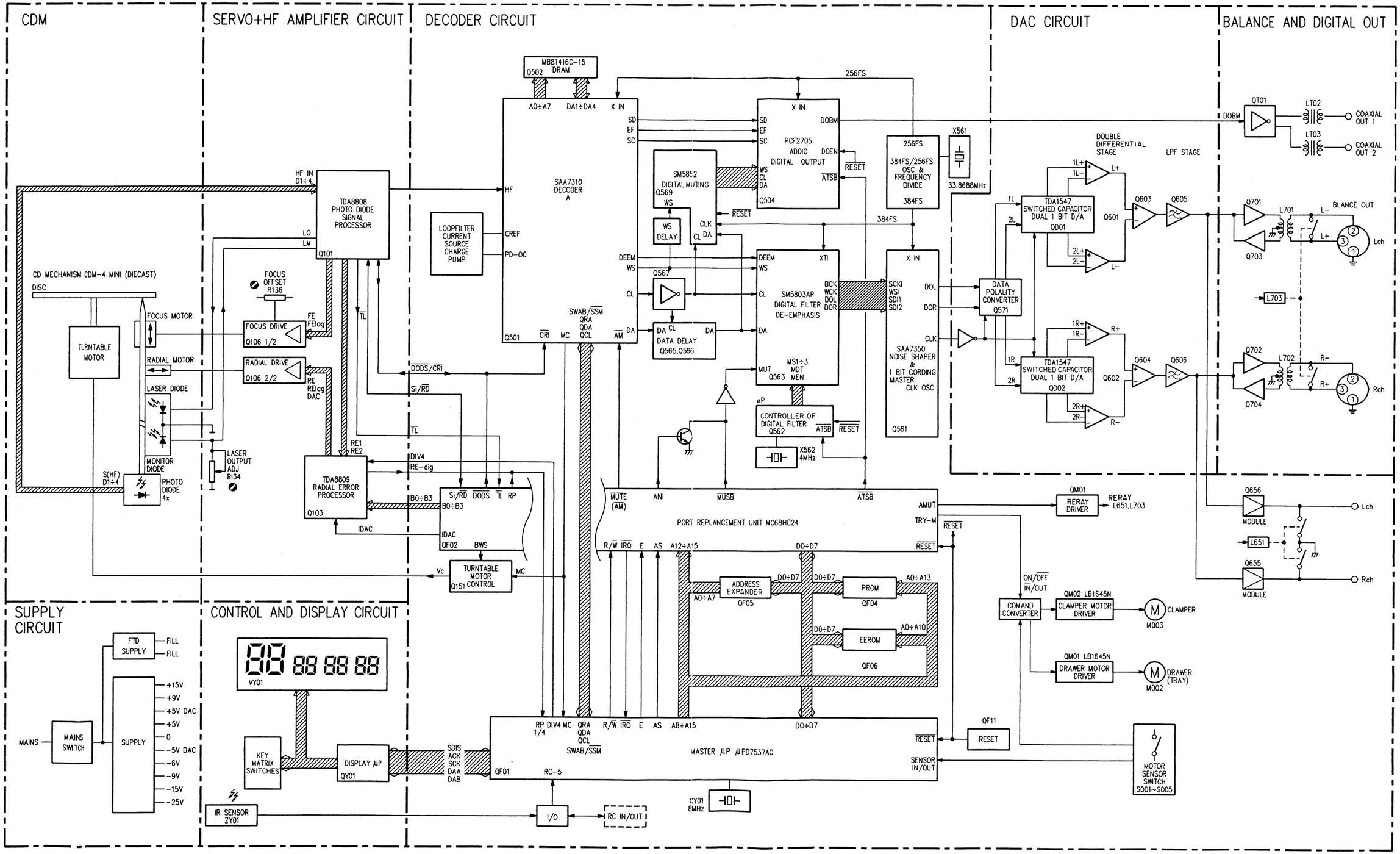
When XLR connector cables are used and if your preamplifier or main amplifier uses the Europe method, the reproduced signal may be out of phase.
In this case, change the connections of pin 2 and pin 3 of one of the XLR connectors of the cable to the USA method.
Also when you use an XLR balanced cable (see illustration below) and if the preamplifier or main amplifier uses the Europe method, change the connections of pin 2 and pin 3 of one of the XLR connectors of the cable to the USA method.



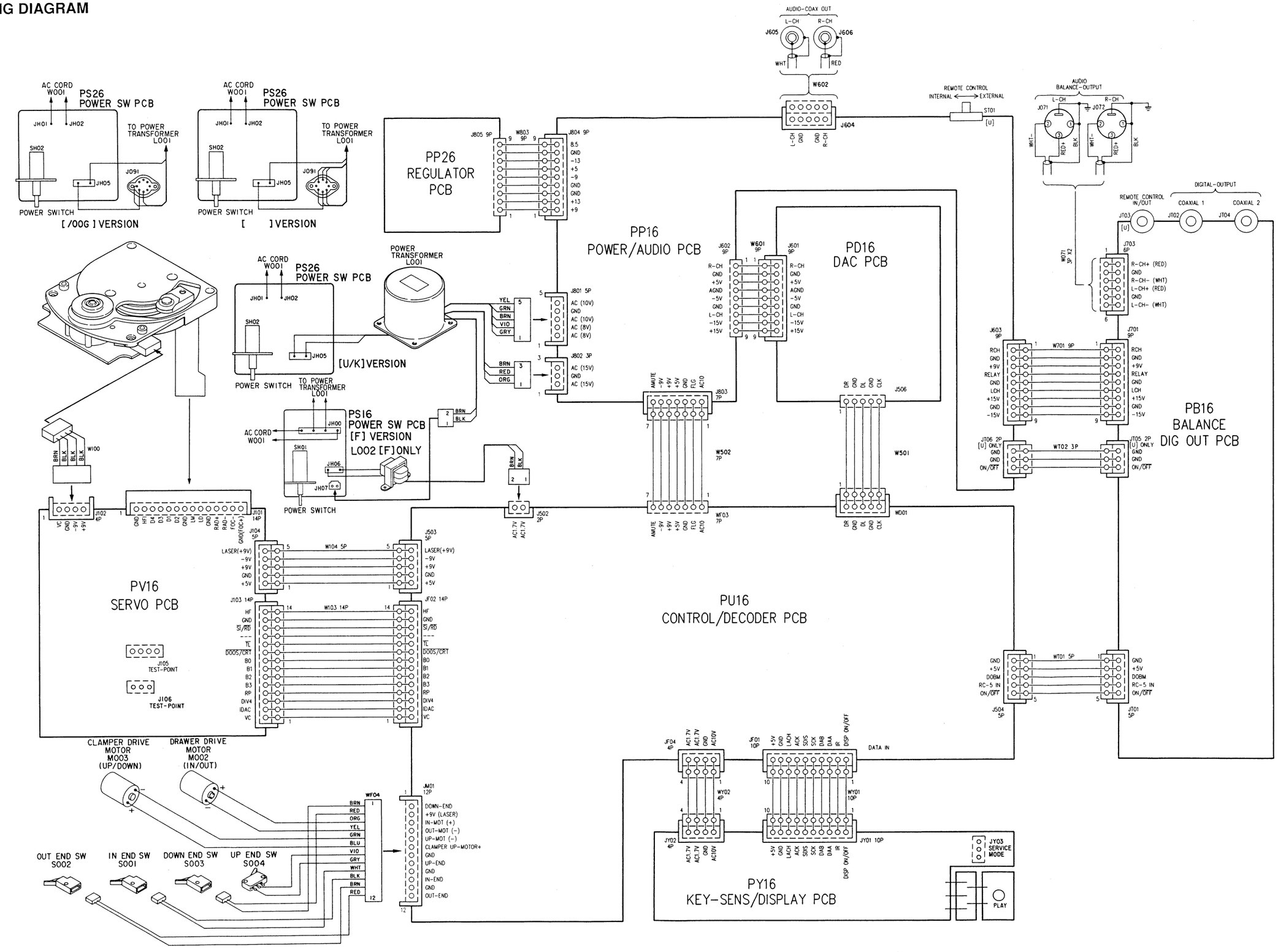
(XLR) (XLR)

Now the signal can be reproduced in proper phase.

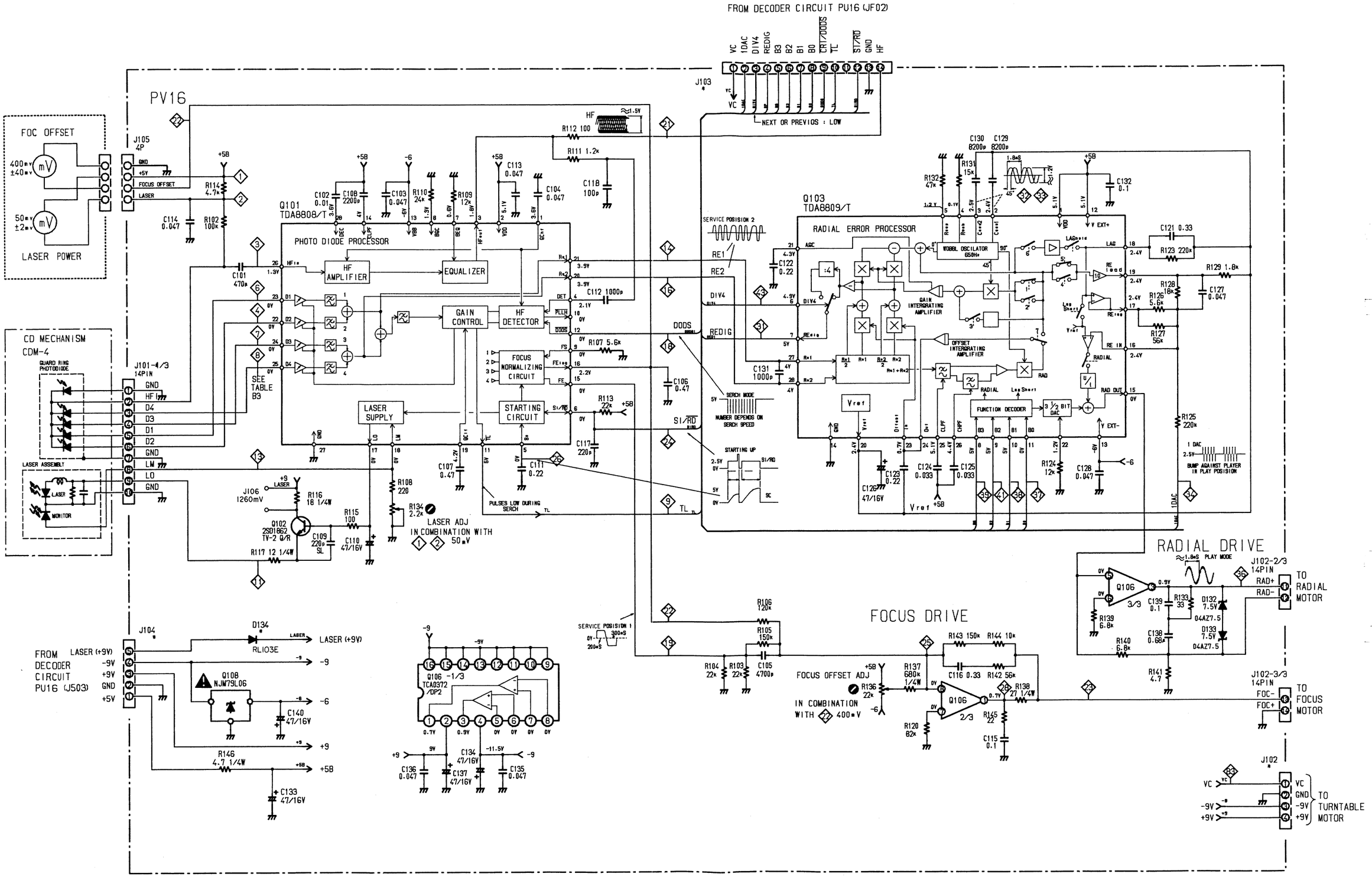
4. BLOCK DIAGRAM



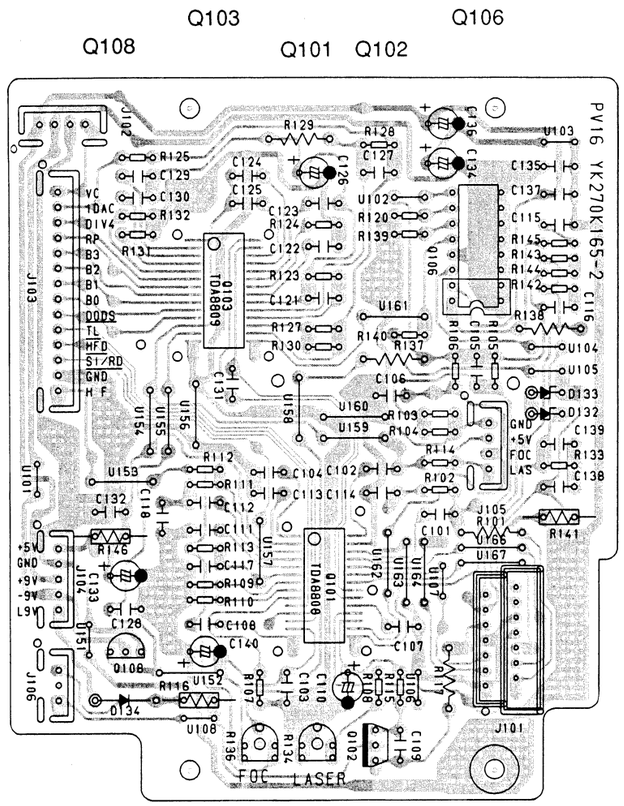
5. WIRING DIAGRAM

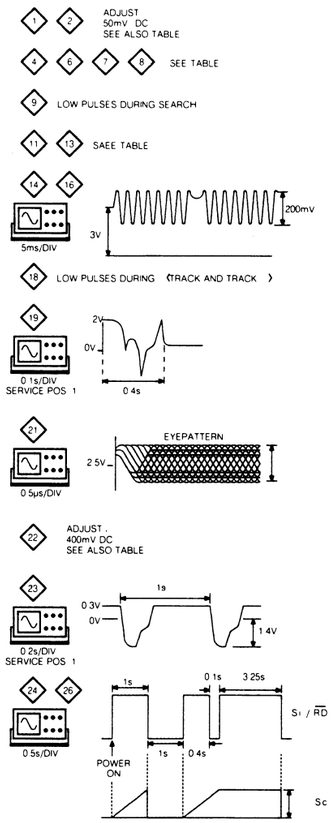


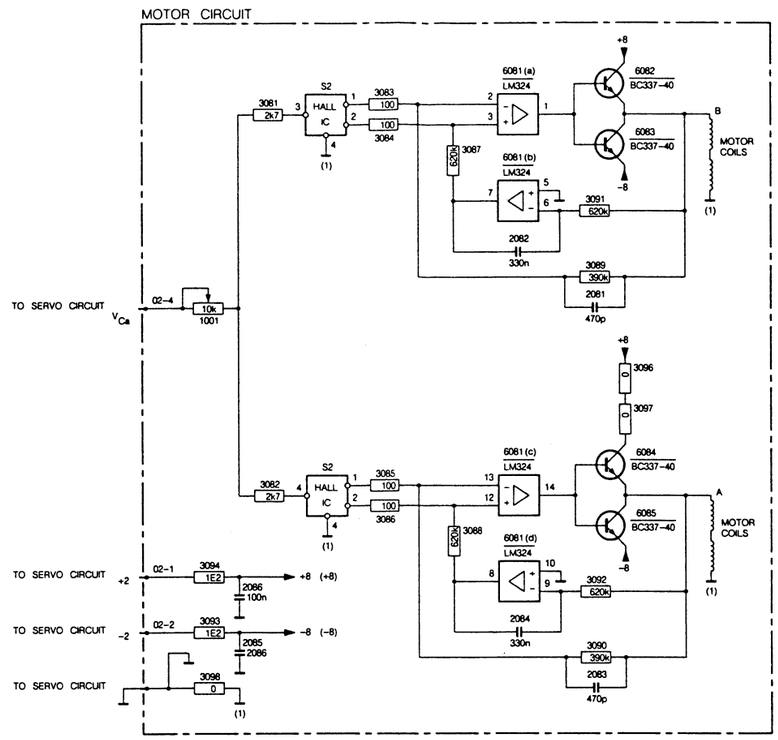
6. SCHEMATIC DIAGRAM AND PARTS LOCATIONS

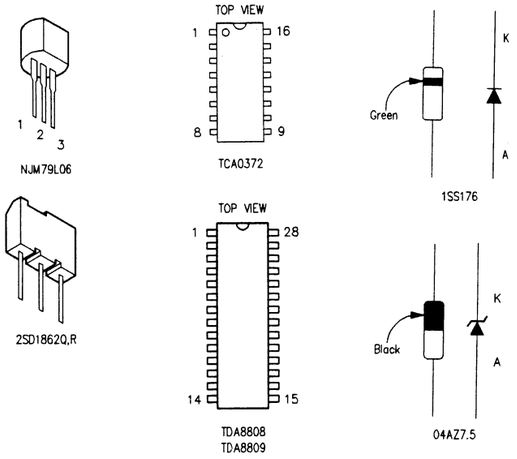


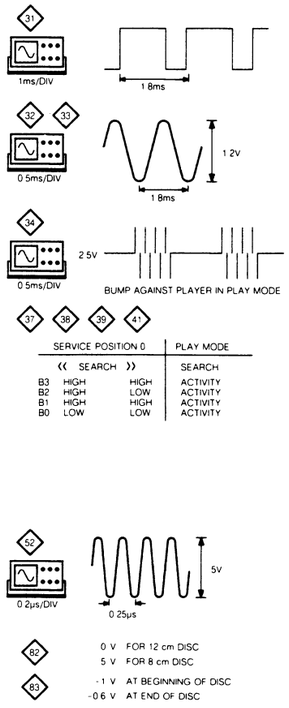
PV16 (PATTERN SIDE)

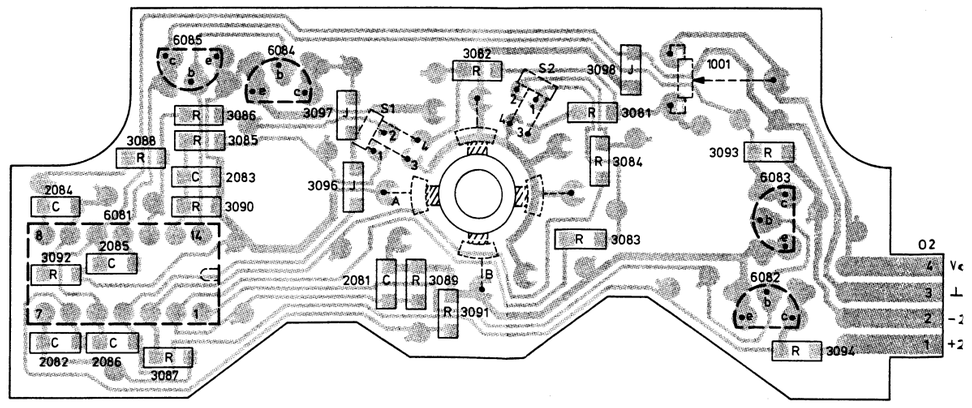




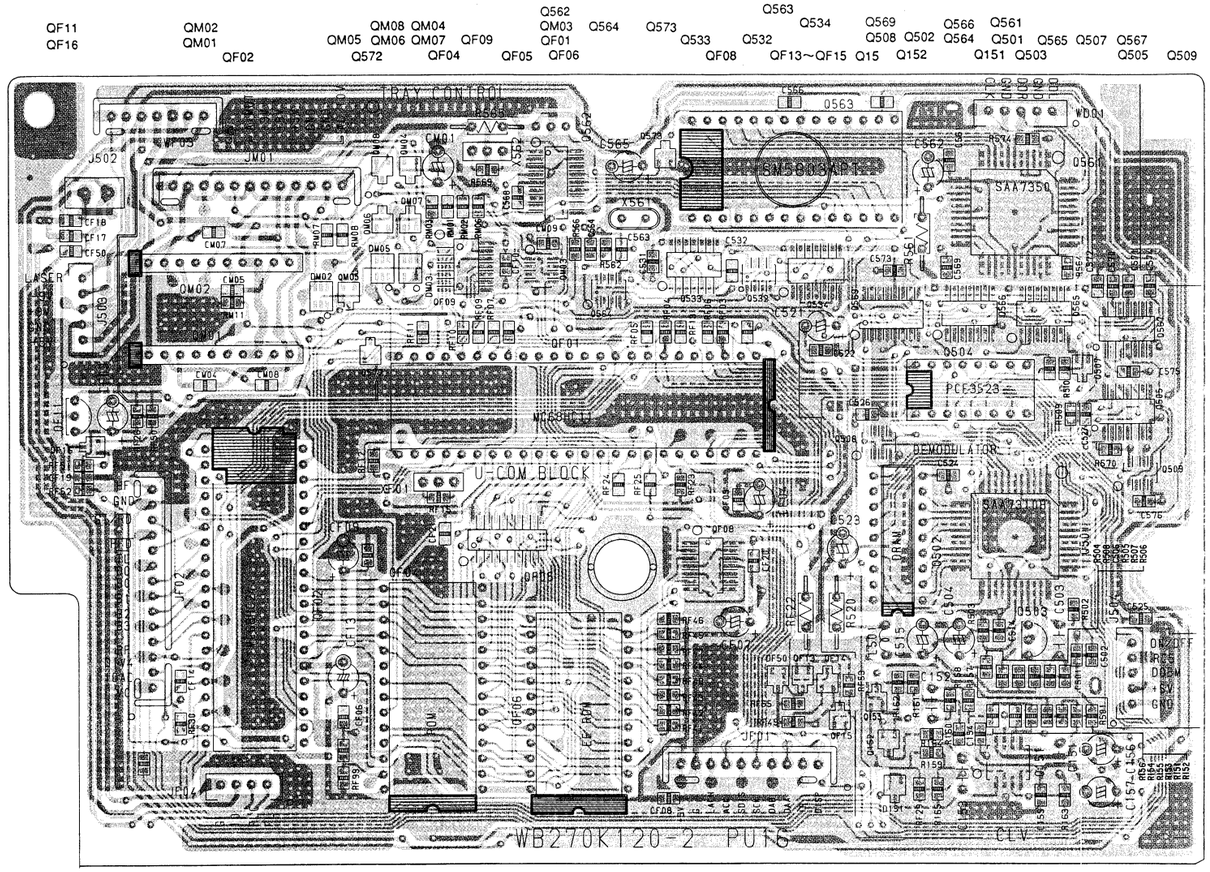


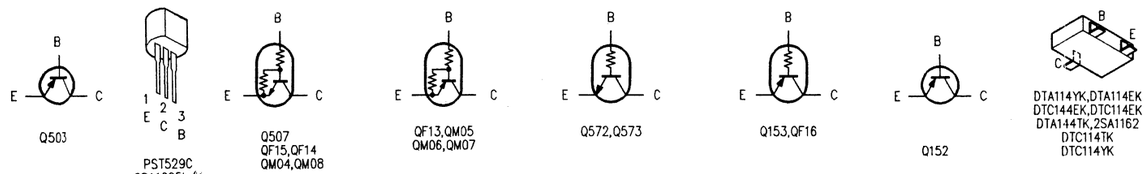


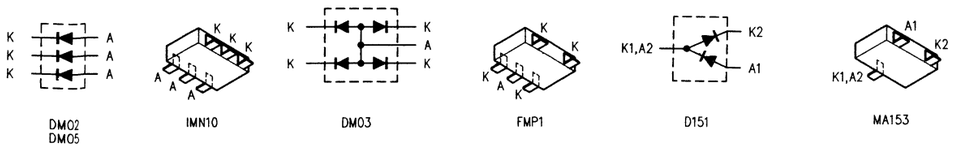


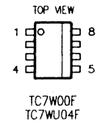


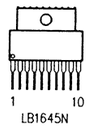
PU16 (COMPONENT SIDE)

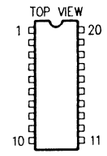


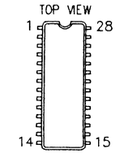


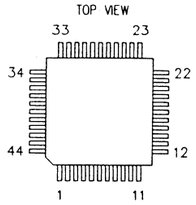


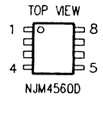


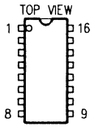


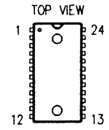


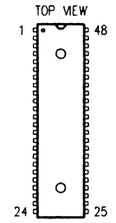


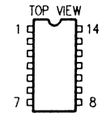


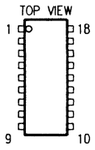


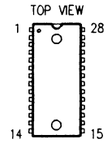


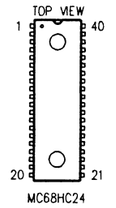


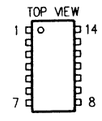


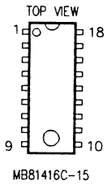




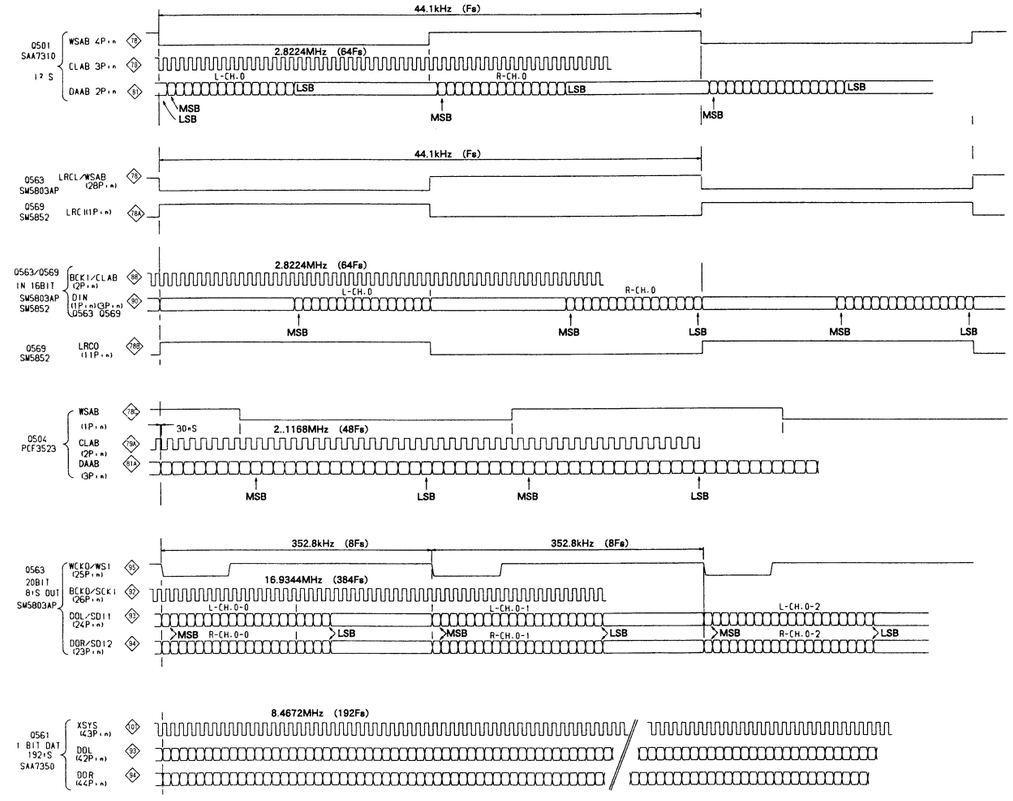




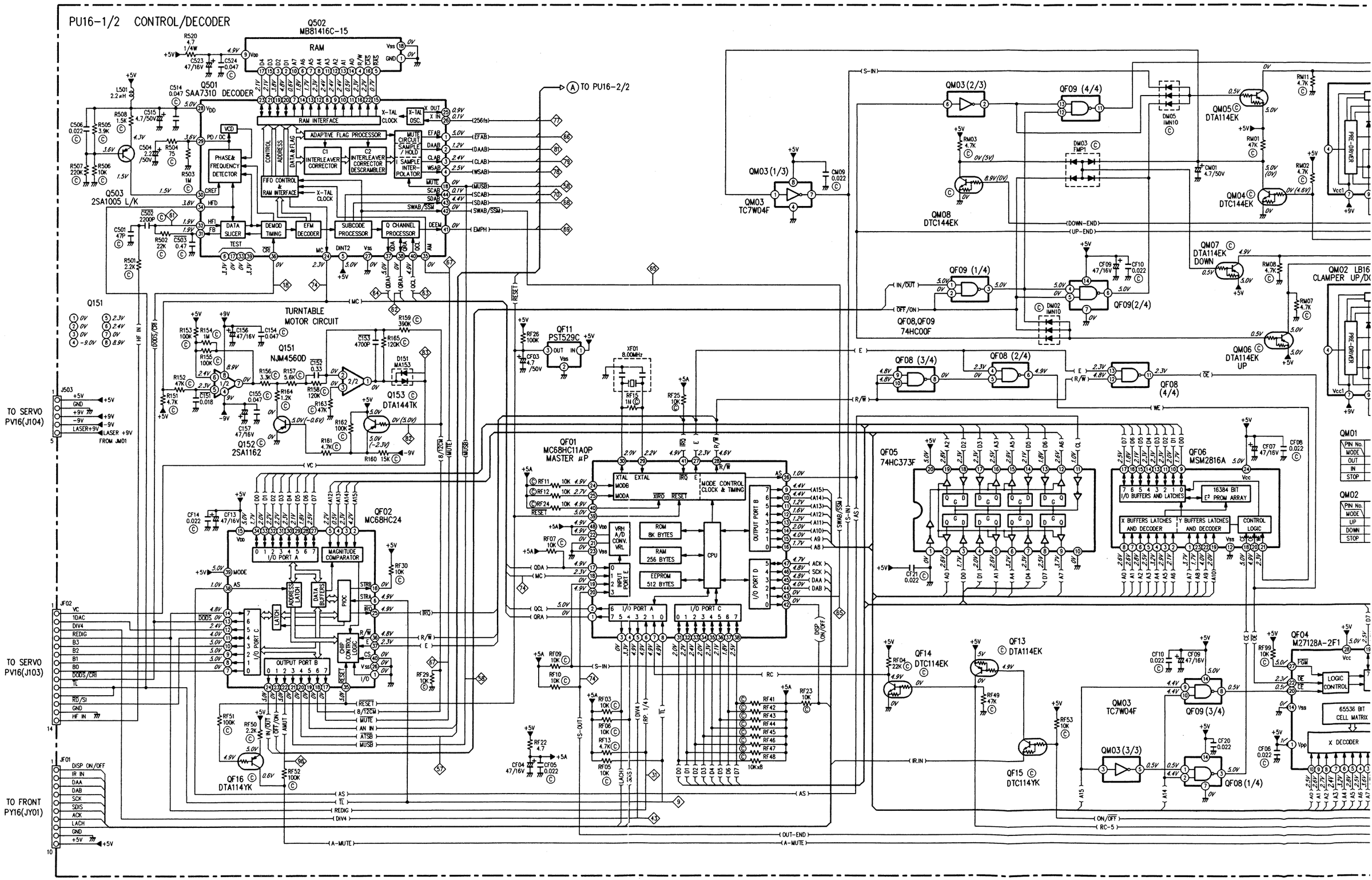


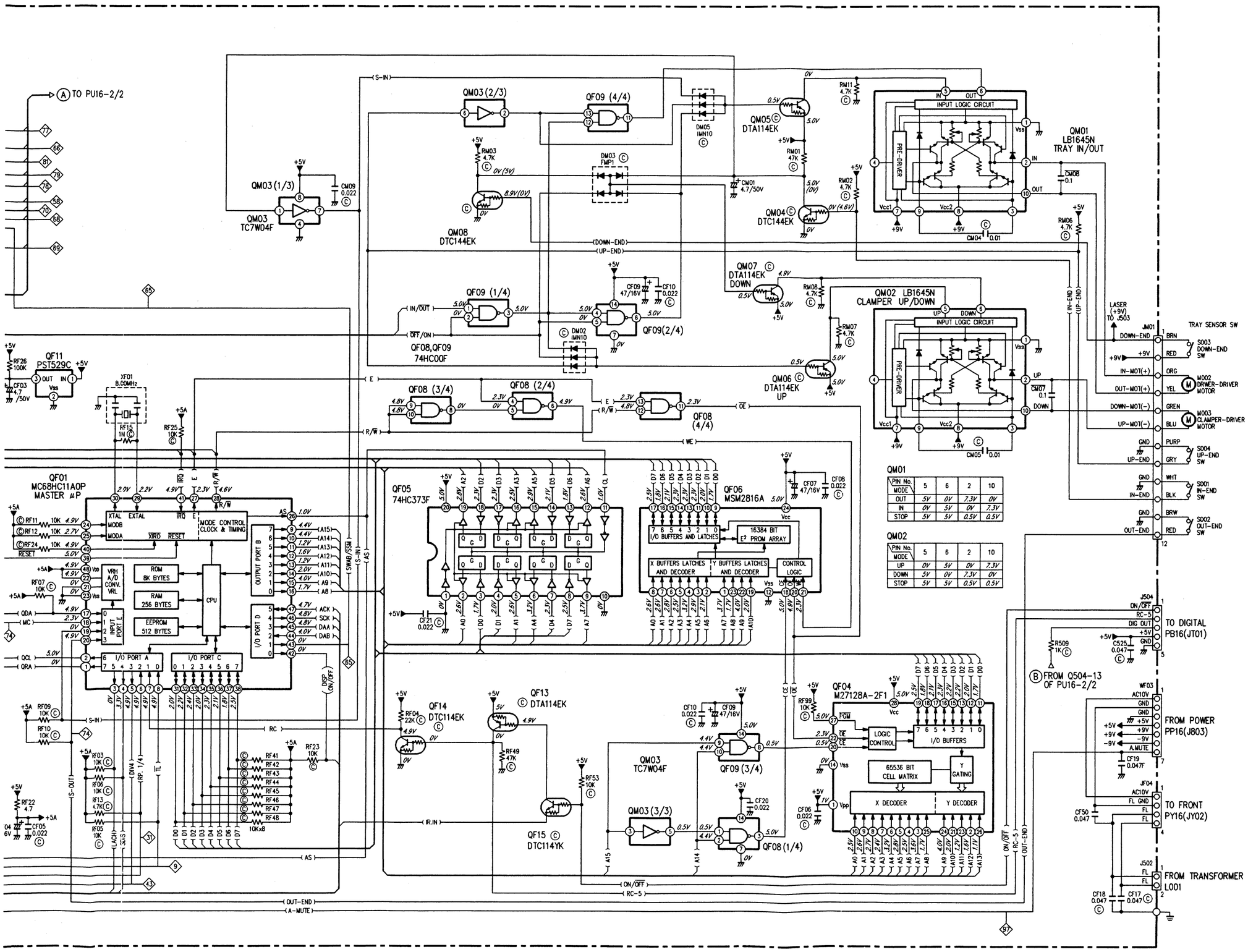


TIMING CHART

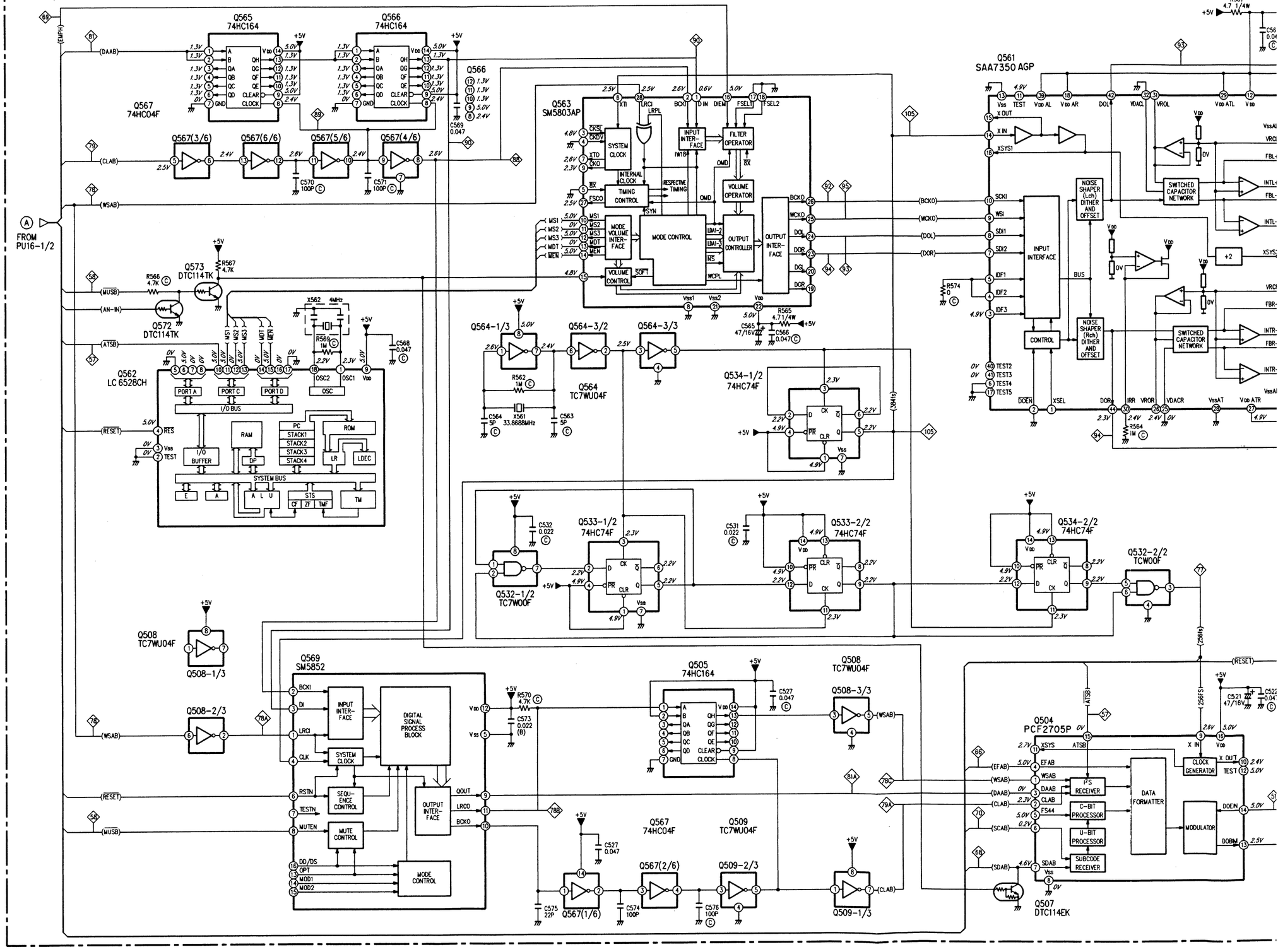


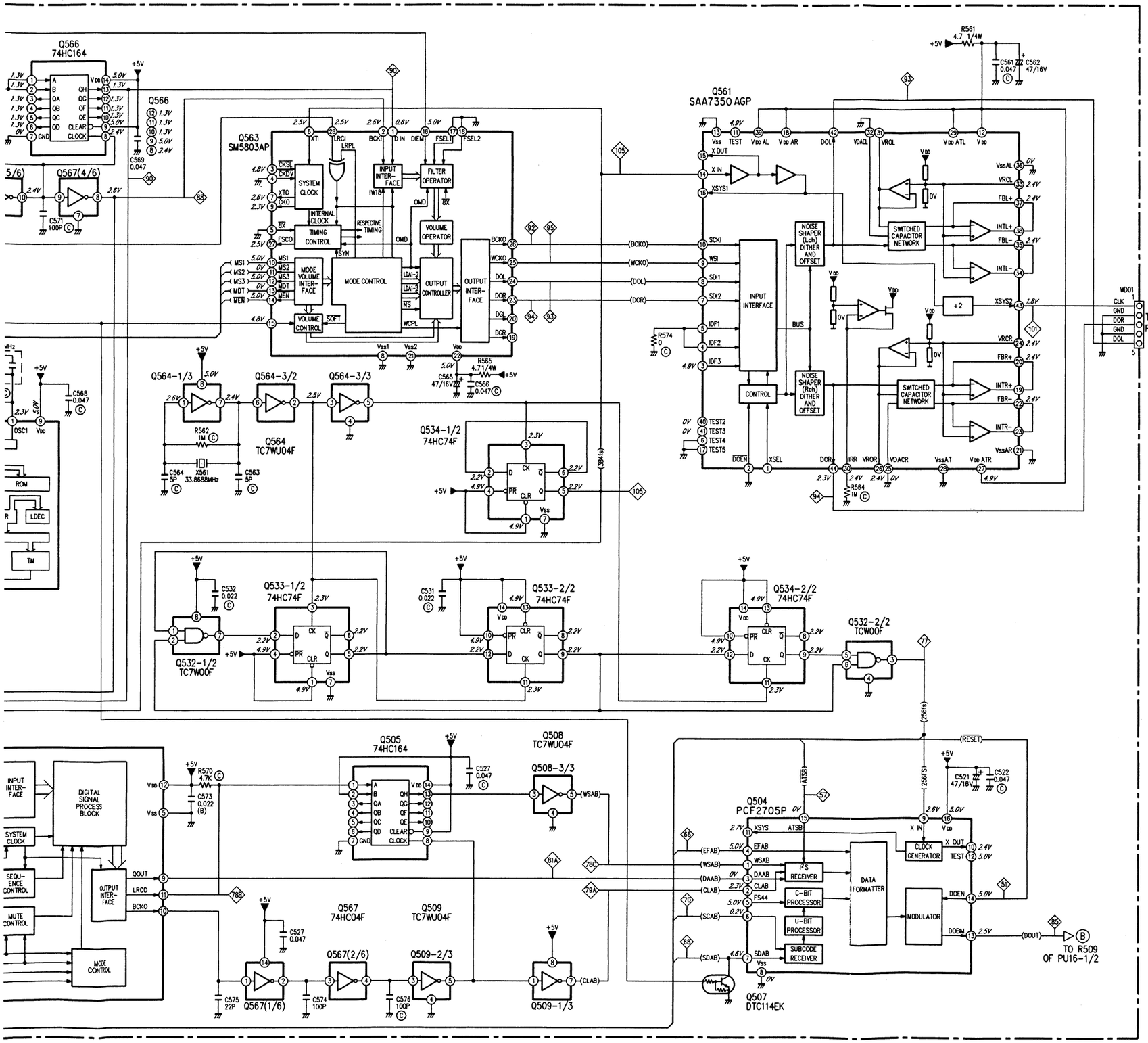
PU16-1/2 CONTROL/DECODER




TO PU16-2/2
QM03 (2/3)
QF09 (4/4)
QM03 (1/3)
QM03 TC7W04F
QM08 DTC144EK
QM05 DTA114EK
QM04 DTC144EK
QM01 LB1645N TRAY IN/OUT
QM07 DTA114EK DOWN
QM06 DTA114EK UP
QM02 LB1645N CLAMPER UP/DOWN
QF09 (1/4)
QF09(2/4)
QF08,QF09 74HC00F
QF08 (3/4)
QF08 (2/4)
QF08 (4/4)
QF11 PST529C
QF01 MC68HC11A0P MASTER μP
QF05 74HC373F
QF06 MSM2816A
QF14 DTC114EK
QF13 DTA114EK
QF15 DTC114YK
QF04 M27128A-2F1
QF08 (1/4)
QF09 (3/4)
QM03 TC7W04F
QM03 (3/3)
TRAY SENSOR SW
SD03 DOWN-END SW
SD04 UP-END SW
SD01 IN-END SW
SD02 OUT-END SW
M002 DRAWER-DRIVER MOTOR
M003 CLAMPER-DRIVER MOTOR
TO DIGITAL PB16(JT01)
FROM POWER PP16(J803)
TO FRONT PY16(JY02)
FROM TRANSFORMER L001
FROM Q504-13 OF PU16-2/2
LASER (+9V) TO J503
QM01
PIN No. / MODE: 5 6 2 10
OUT 5V 0V 7.3V 0V
IN 0V 5V 0V 7.3V
STOP 5V 5V 0.5V 0.5V
QM02
PIN No. / MODE: 5 6 2 10
UP 0V 5V 0V 7.3V
DOWN 5V 0V 7.3V 0V
STOP 5V 5V 0.5V 0.5V

PU16-2/2 CONTROL/DECORDER





16 LOW PULSES DURING NEXT AND PREVIOUS

53 ACTIVITY WHEN USING AN IR REMOTE CONTROL.

61 EYEPATTERN
0.5µs/DIV 2.5V

62 PLAY POSITION
10ms/DIV ORA
ASYNCHRONOUS µP DEPENDENT

63 10x8BITS
0.2ms/DIV OCL

64 DATA
QDA

66 PULSES WHEN THE DISC IS SLOWLY BRAKED BY HAND

67 50µs/DIV 136µs

68 ACTIVITY DURING PLAY

69 AUDIO SIGNALS DISC: HIGH ON TRACK 76 78 80 82 84 86 88
LOW ON TRACK 77 79 81 83 85 87 89

74 MC SIGNAL
5µs/DIV 0V 11µs
STAND BY POSITION
0V
BEGINNING PLAY POSITION
0V
PLAY POSITION

77 11.2896 MHz SINEWAVE

78 PLAY POSITION
5µs/DIV WSAB
79 CLAB 11.34µs

81 ACTIVITY DURING PLAY

82 0 V FOR 12 cm DISC
5 V FOR 8 cm DISC

83 1 V AT BEGINNING OF DISC
-0.6 V AT END OF DISC

QF01: MC68HC11AOP

Pin No.	Port Name		I/O	ACT	Function	Pin No.	Port Name		I/O	ACT	Function
1	PA7	QRA	I	H	Q-channel Request Acknowledge	25	MOD A	MOD. A	I	H	Pull up
2	PA6	QCL	O	X	Q-channel CLK	26	AS	AS	O	X	ADDRESS STROBE
3	PA5	LACH	O	L	No use	27	E	E	O	H	Chip Enable
4	PA4	SDIS	I/O	X	Master or Slave µPC select	28	R/$\overline{W}$	R/$\overline{W}$	O	X	Memory Write or Read
5	PA3	DIV4	O		DIVIDE REDIG PULS Control	29	EXTAL	XI	I		X. TAL in 8 MHz
6	PA2	RP 1/4	I	X	DIVIDED 1 or 1/4 REDIG PULS	30	XTAL	XO	O		X. TAL out
7	PA1	RC	I	X	RC-5 Pulse Data in put	31	PC0	D0	I/O	X	µPC digital Data
8	PA0	$\overline{PL}$	O	L	TRACK Loss out Signal input	32	PC1	D1	I/O	X	µPC digital Data
9	PB7	A15	O	X	ADDRESS EXT Memory or IC	33	PC2	D2	I/O	X	µPC digital Data
10	PB6	A14	O	X	ADDRESS EXT Memory or IC	34	PC3	D3	I/O	X	µPC digital Data
11	PB5	A13	O	X	ADDRESS EXT Memory or IC	35	PC4	D4	I/O	X	µPC digital Data
12	PB4	A12	O	X	ADDRESS EXT Memory or IC	36	PC5	D5	I/O	X	µPC digital Data
13	PB3	A11	O	X	ADDRESS EXT Memory or IC	37	PC6	D6	I/O	X	µPC digital Data
14	PB2	A10	O	X	ADDRESS EXT Memory or IC	38	PC7	D7	I/O	X	µPC digital Data
15	PB1	A9	O	X	ADDRESS EXT Memory or IC	39	$\overline{RESET}$	$\overline{RESET}$	I	L	Reset
16	PB0	A8	O	X	ADDRESS EXT Memory or IC	40	$\overline{XIRQ}$	XIRQ	I	H	Pull up
17	PE0	QDA	I	X	Q-channel Data input	41	IRQ	RQ	I	L	INTERRUPT REQUEST
18	PE1	MC	I	X	CLV Motor control PULS	42	PD0	DISP	O	H	Display ON/$\overline{OFF}$
19	PE2	SIN	I	L	Loading Tray in End	43	PD1	SWAB/$\overline{SSM}$	O	H	CLV control ON/$\overline{OFF}$
20	PE3	SOUT	O	L	Loading Tray out End	44	PD2	DATA I	I	X	µPC digital data in
21	VRL	VRL	I	L	Gnd	45	PD3	DATA OUT	O	X	µPC digital data out
22	VRH	VRH	I	H	+5V	46	PD4	SCK	I/O	X	µPC digital data CLK
23	VSS	VSS			Gnd	47	PD5	ACK	I/O	X	µPC digital data Acknowledge
24	MOD B	MOD. B	I	H	Pull up	48	VDD	VDD			

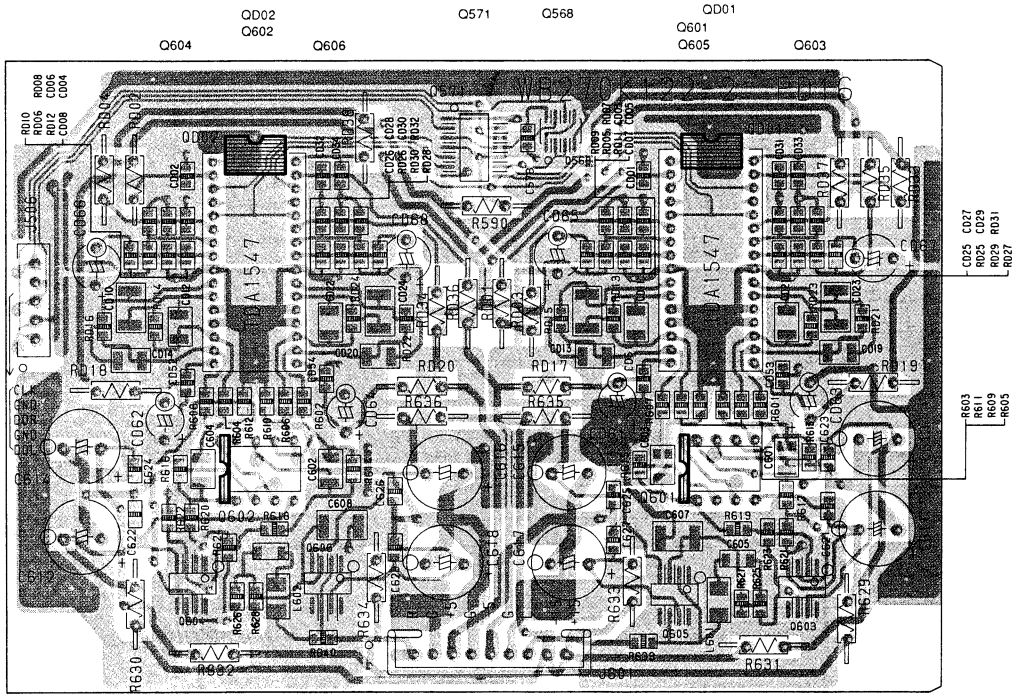
QY01: µPD7537ACU

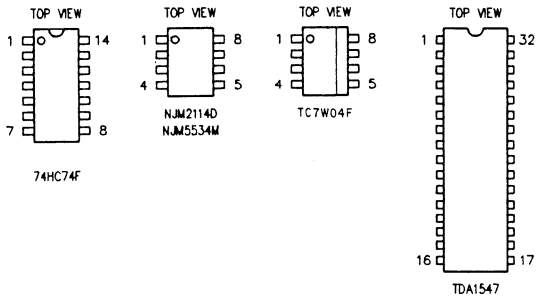
Pin No.	Port Name		I/O	ACT	Function	Pin No.	Port Name		I/O	ACT	Function
1	REST	REST	I	H	Reset	22	P93	P	O	H	Digital out put
2	CL1	CL1	I		OSC 590KHz in	23	P92	O	O	H	Digital out put
3	CL2	CL2	O		OSC 590KHz out	24	P91	N	O	H	Digital out put
4	V_{PRE}	V_{PRE}	I		PRI Driver power Source	25	P90	M	O	H	Digital out put
5	V_{LOAD}	V_{LOAD}	I		Power Supply for display	26	P83	L	O	H	Digital out put
6	P53	NOMAL	I	H	Pull up	27	P82	K	O	H	Digital out put
7	P52	A. PAUSEL	I	H	Pull up	28	P81	J	O	H	Digital out put
8	P51	GND	I	L	Pull down	29	P80	I	O	H	Digital out put
9	P50	GND	I	L	Pull down	30	P43	K1	I	H	Key input
10	P23	ACK	I/O	X	Acknowledge	31	P42	K2	I	H	Key input
11	P22	A. B	O	H	Segment Data	32	P41	K3	I	H	Key input
12	P21	CLK	O	H	Segment Data clock	33	P40	K4	I	H	Key input
13	P103	T	O	H	Digital out put	34	P33	H	O	H	Digital out put
14	P102	S	O	H	Digital out put	35	P32	G	O	H	Digital out put
15	P101	R	O	H	Digital out put	36	P31	F	O	H	Digital out put
16	P100	Q	O	H	Digital out put	37	P30	E	O	H	Digital out put
17	P113	D	O	H	Digital out put	38	P03	DAA	I	X	Data input from Master up
18	P112	C	O	H	Digital out put	39	P02	DAB	O	X	Data output for Master up
19	P111	B	O	H	Digital out put	40	P01	SCK	I/O	X	Data CLOCK
20	P110	A	O	H	Digital out put	41	P00	SDIS	I/O	X	Master or Slave up Select
21	VDD	VDD			+5V	42	VSS	GND			Gnd

Q562: LC6528CH

Pin No.	Port Name		I/O	ACT	Function	Pin No.	Port Name		I/O	ACT	Function
1	OSC1	OSC1	I		OSC 4MHz in	10	PC0	$\overline{ATSB}$	I	L	-12dB ATT
2	TEST	GND	I	–	Gnd	11	PC1	MS1	O	X	Digital Filter Control
3	VSS	GND	–	–	Gnd	12	PC2	MS2	O	X	Digital Filter Control
4	$\overline{RES}$	$\overline{RES}$	I	L	Reset	13	PC3	MS3	O	X	Digital Filter Control
5	PA0	GND	I	L	Gnd	14	PD0	MDT	O	X	Digital Filter Control
6	PA1	OPEN	I	H	Open	15	PD1	$\overline{MEN}$	O	X	Digital Filter Control
7	PA2	OPEN	I	H	Open	16	PD2	OPEN	I	H	Open
8	PA3	OPEN	I	H	Open	17	PD3	GND	I	L	Gnd
9	VDD	VDD			+5V	18	OSC2	OSC2	O		OSC 4MHz out

PD16 (COMPONENT SIDE)





PD16 DAC OUT

Q571(1/2) 74HC74

Q568 TC7W04F

Q568(1/3)

Q568(2/3)

Q568 (3/3)

Q571(2/2) 74HC74

QD01 TDA1547

ONE-BIT INPUT

SWITCH DRIVERS

SWITCHED CAPACITOR NETWORK

Q601(1/2) NJM2114D

Q601(2/2) NJM2114D

Q603 NJM5534M

Q605 NJM5534M

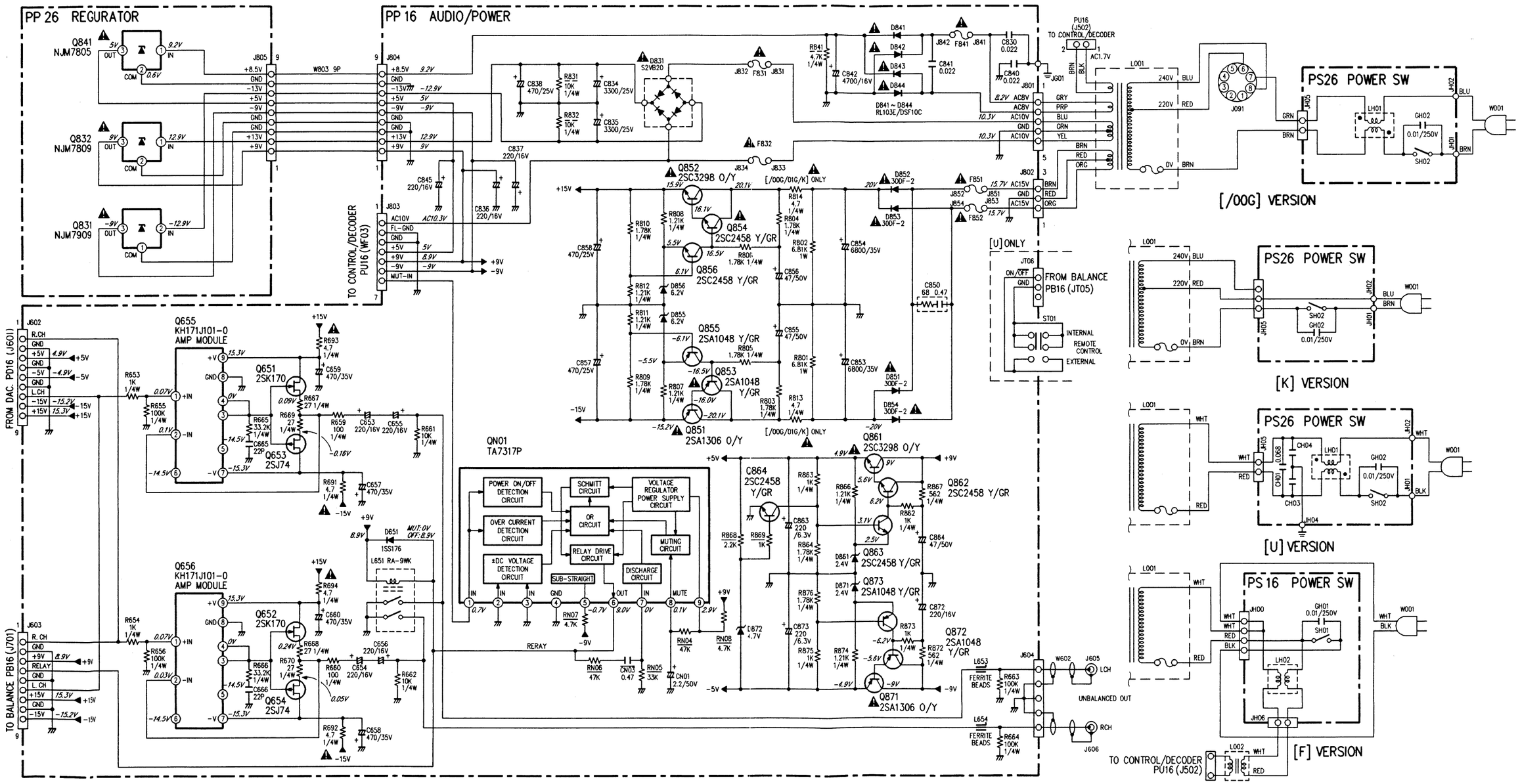
FROM CONTROL/DECODER PU16(WD01)

TO POWER/AUDIO PP16(J602)

R channel

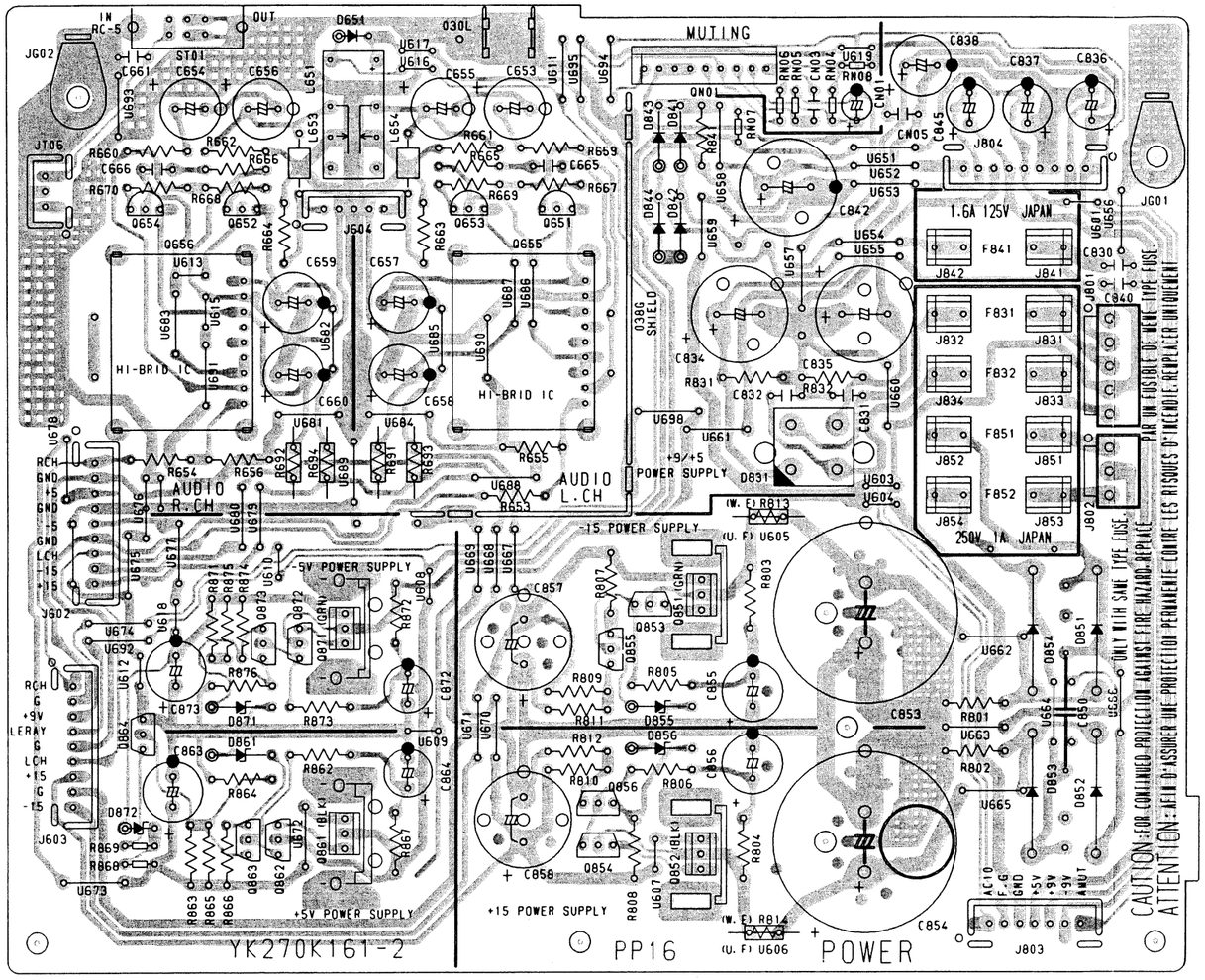
R channel symbol number is L channel symbol number +1.

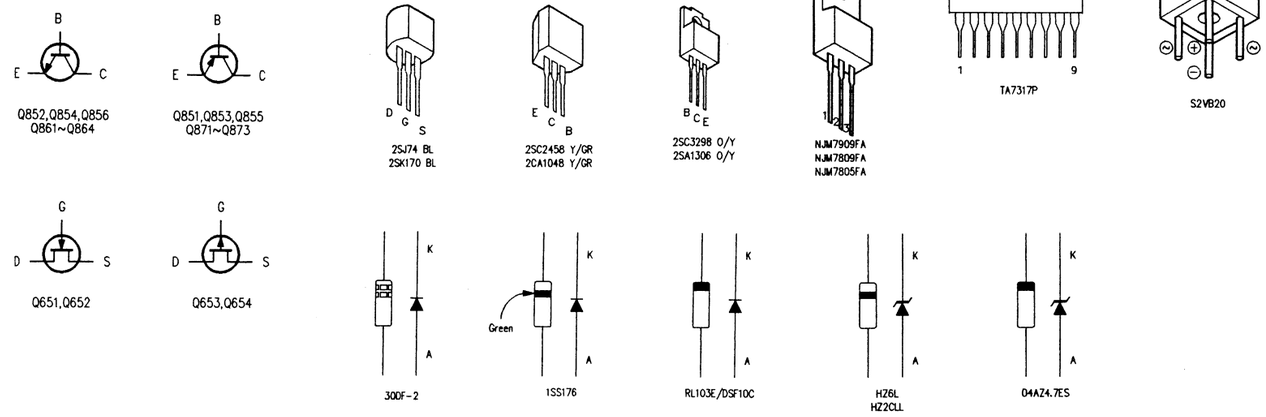
Rチャンネルのシンボルナンバーは上記Lチャンネルのシンボルナンバーに1を加えたものです。


PP 26 REGURATOR
PP 16 AUDIO/POWER
Q841 NJM7805
Q832 NJM7809
Q831 NJM7909
J805
W803 9P
J804
TO CONTROL/DECODER PU16 (WF03)
J803
Q852 2SC3298 O/Y
Q854 2SC2458 Y/GR
Q856 2SC2458 Y/GR
Q855 2SA1048 Y/GR
Q853 2SA1048 Y/GR
Q851 2SA1306 O/Y
[/OOG/OIG/K] ONLY
PU16 (J502) TO CONTROL/DECODER
J601
J802
J801
L001
PS26 POWER SW
[/OOG] VERSION
[U] ONLY
FROM BALANCE PB16 (JT05)
INTERNAL
REMOTE CONTROL
EXTERNAL
[K] VERSION
[U] VERSION
PS16 POWER SW
[F] VERSION
TO CONTROL/DECODER PU16 (J502)
FROM DAC PD16 (J601)
Q655 KH171J101-0 AMP MODULE
Q656 KH171J101-0 AMP MODULE
Q651 2SK170
Q652 2SK170
Q653 2SJ74
Q654 2SJ74
TO BALANCE PB16 (J701)
J602
J603
QN01 TA7317P
POWER ON/OFF DETECTION CIRCUIT
OVER CURRENT DETECTION CIRCUIT
±DC VOLTAGE DETECTION CIRCUIT
SCHMITT CIRCUIT
OR CIRCUIT
RELAY DRIVE CIRCUIT
SUB-STRAIGHT
VOLTAGE REGULATOR POWER SUPPLY CIRCUIT
MUTING CIRCUIT
DISCHARGE CIRCUIT
RERAY
Q861 2SC3298 O/Y
Q862 2SC2458 Y/GR
Q863 2SC2458 Y/GR
Q873 2SA1048 Y/GR
Q872 2SA1048 Y/GR
Q871 2SA1306 O/Y
J604
J605
J606
UNBALANCED OUT
LCH
RCH

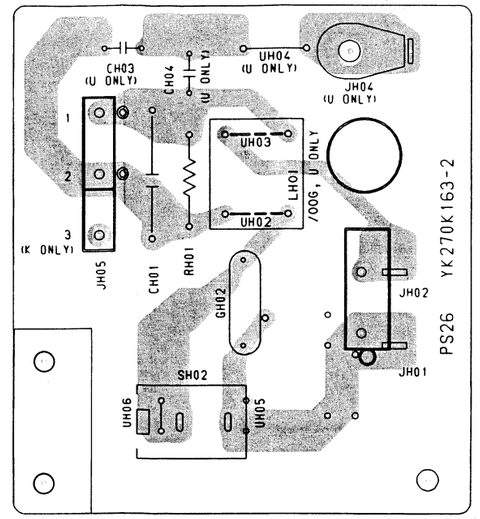
PP16 (PATTERN SIDE)

Q654 Q652 Q873, Q872, Q871 Q653 Q651 Q855, Q853, Q851
Q864 Q863, Q862, Q861 Q854, Q856, Q852

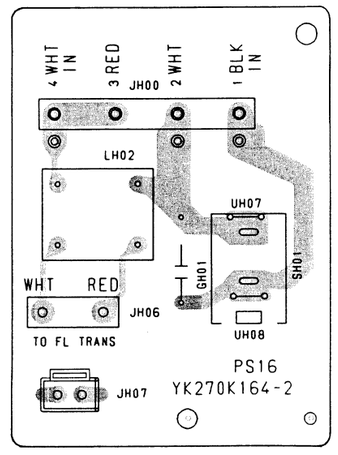




PS26 (PATTERN SIDE)

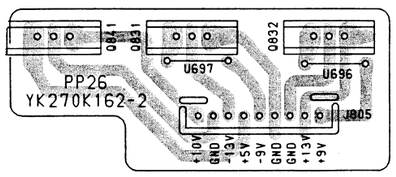


PS16 [F] VERSION

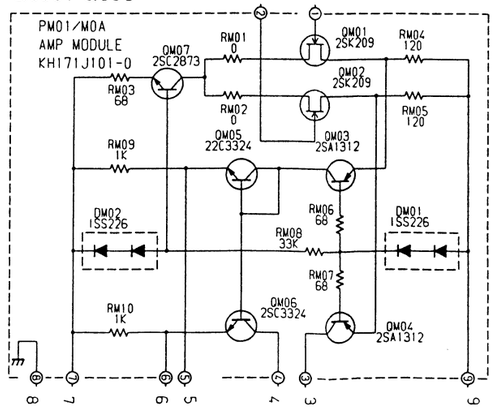


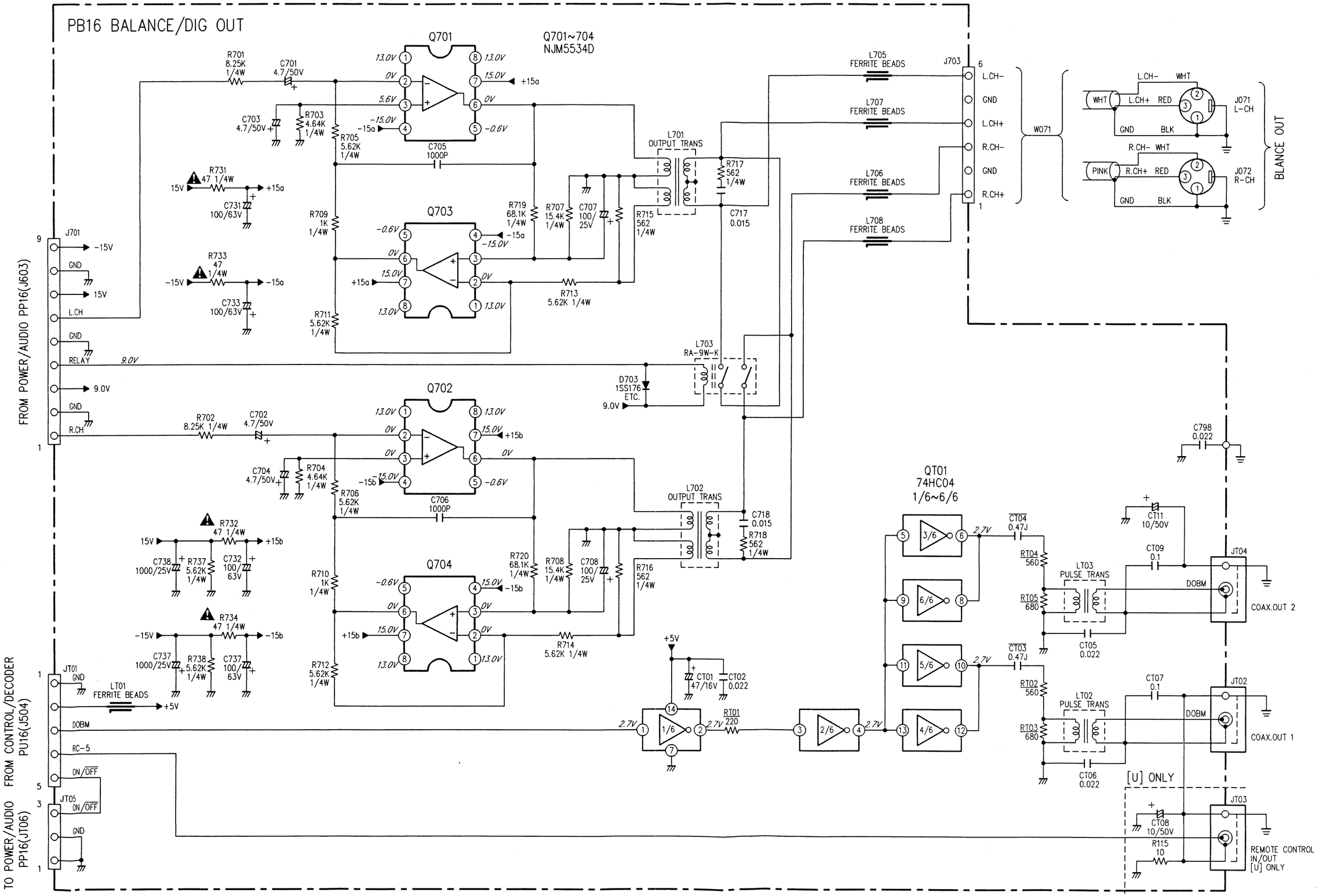
PP26 (PATTERN SIDE)

Q841 Q831 Q832

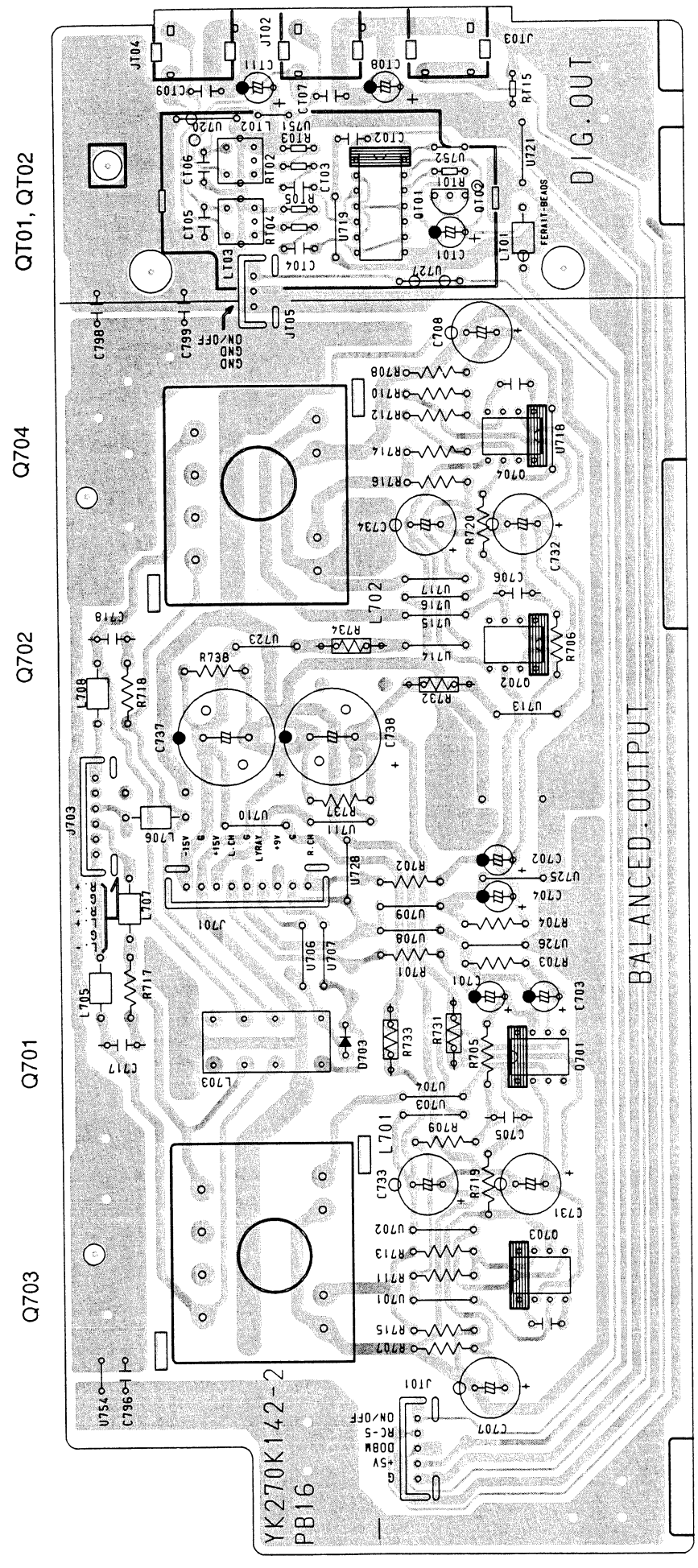


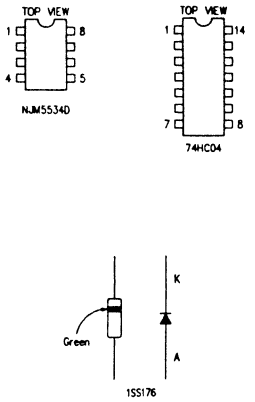
Q655 / Q656




PB16 BALANCE/DIG OUT
FROM POWER/AUDIO PP16(J603)
TO POWER/AUDIO PP16(JT06)
FROM CONTROL/DECODER PU16(J504)
J701
9
1
-15V
GND
15V
L.CH
GND
RELAY
9.0V
GND
R.CH
JT01
GND
LT01
FERRITE BEADS
+5V
DOBM
RC-5
ON/OFF
JT05
ON/OFF
GND
5
3
1
Q701
Q701~704
NJM5534D
R701
8.25K
1/4W
C701
4.7/50V
C703
4.7/50V
R703
4.64K
1/4W
R705
5.62K
1/4W
C705
1000P
R731
47 1/4W
15V
+15a
C731
100/63V
R733
47
1/4W
-15V
-15a
C733
100/63V
Q703
R709
1K
1/4W
R711
5.62K
1/4W
R719
68.1K
1/4W
R707
15.4K
1/4W
C707
100/
25V
R713
5.62K 1/4W
L701
OUTPUT TRANS
R717
562
1/4W
C717
0.015
R715
562
1/4W
L703
RA-9W-K
D703
1SS176
ETC.
9.0V
Q702
R702
8.25K 1/4W
C702
4.7/50V
C704
4.7/50V
R704
4.64K
1/4W
R706
5.62K
1/4W
C706
1000P
R732
47 1/4W
15V
+15b
C738
1000/25V
R737
5.62K
1/4W
C732
100/
63V
R734
47 1/4W
-15V
-15b
C737
1000/25V
R738
5.62K
1/4W
C737
100/
63V
Q704
R710
1K
1/4W
R712
5.62K
1/4W
R720
68.1K
1/4W
R708
15.4K
1/4W
C708
100/
25V
R714
5.62K 1/4W
L702
OUTPUT TRANS
C718
0.015
R718
562
1/4W
R716
562
1/4W
+5V
CT01
47/16V
CT02
0.022
RT01
220
QT01
74HC04
1/6~6/6
L705
FERRITE BEADS
L707
FERRITE BEADS
L706
FERRITE BEADS
L708
FERRITE BEADS
J703
6
1
L.CH-
GND
L.CH+
R.CH-
GND
R.CH+
W071
L.CH- WHT
WHT L.CH+ RED
GND BLK
J071
L-CH
R.CH- WHT
PINK R.CH+ RED
GND BLK
J072
R-CH
BLANCE OUT
C798
0.022
CT04
0.47J
CT03
0.47J
RT04
560
RT05
680
RT02
560
RT03
680
LT03
PULSE TRANS
LT02
PULSE TRANS
CT05
0.022
CT06
0.022
CT11
10/50V
CT09
0.1
CT07
0.1
JT04
JT02
DOBM
COAX.OUT 2
COAX.OUT 1
[U] ONLY
JT03
CT08
10/50V
R115
10
REMOTE CONTROL
IN/OUT
[U] ONLY

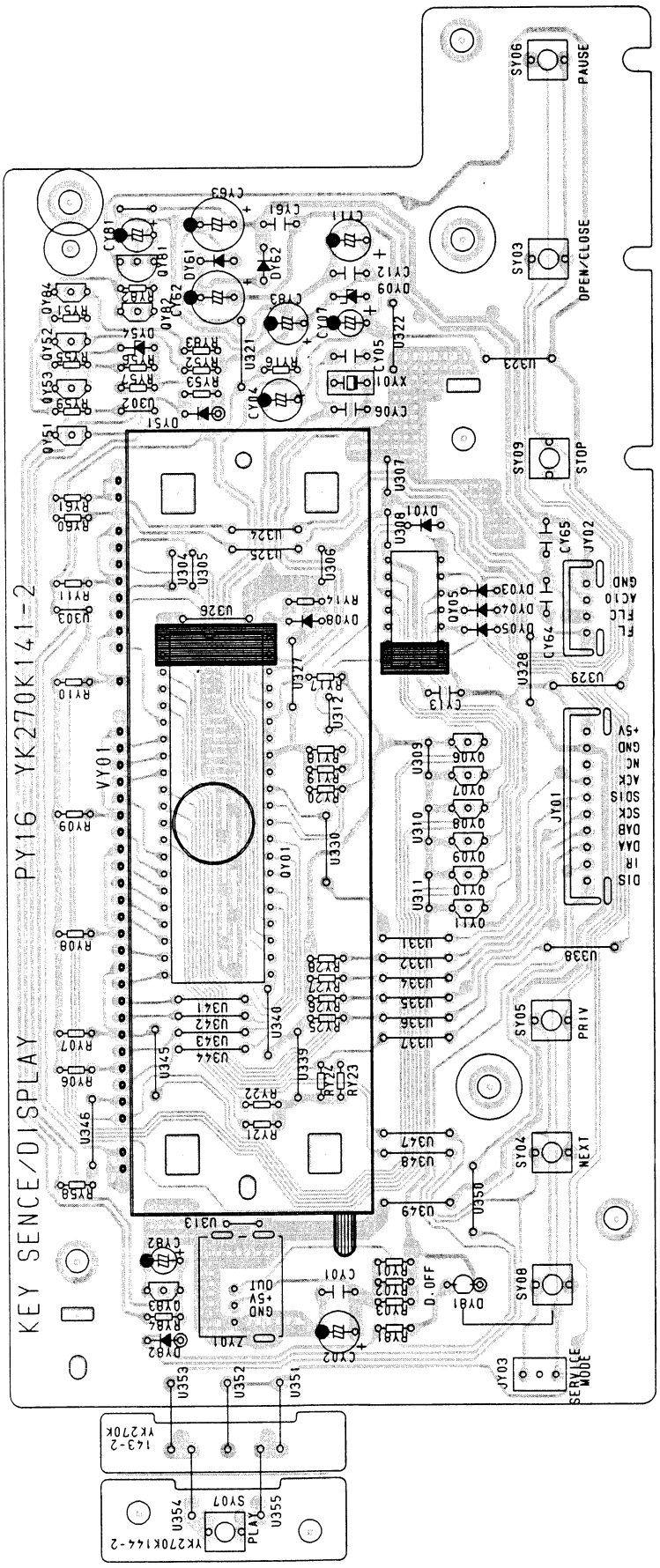
PB16 (PATTERN SIDE)

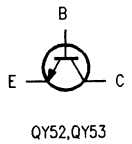




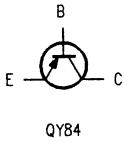
PY16 (PATTERN SIDE)

QY84, QY51~QY53
QY81, QY82
QY05
QY01
QY06~QY11
QY83

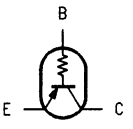




QY52,QY53



QY84



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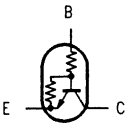

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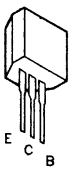

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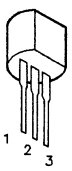
2SA605SP



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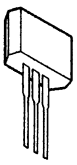

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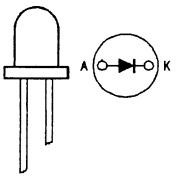
DTC114ES



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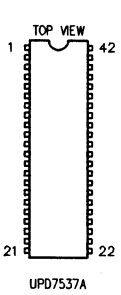
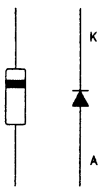
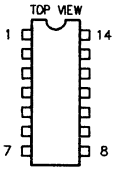


UPD7537A



S5688G



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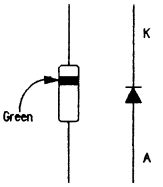

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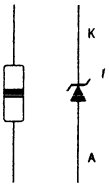


04AZ9.1
5.6V

PY16 DISPLAY

VY01 FL

DISK
ERROR
SHUFFLE
RECALL
REPEAT
AMS
A◁▷B
TRACK
INDEX
TTL
REMTIME
LAPTIME
MIN
SEC

QY01 UPD7537A

I/O PORT 10
OUTPUT PORT 9
OUTPUT PORT 3
OUTPUT PORT 8
I/O PORT 11
128x4 BITS RAM
2048x8 BITS ROM
CPU
CLOCK & TIMING
I/O PORT 0
I/O PORT 4
OUTPUT PORT 3
I/O PORT 5

QY06~QY11 DTA114TS
QY06
QY07
QY08
QY09
QY10
QY11

QY05 74HC164
8-BIT SERIAL/PARALLEL SHIFT REGISTER

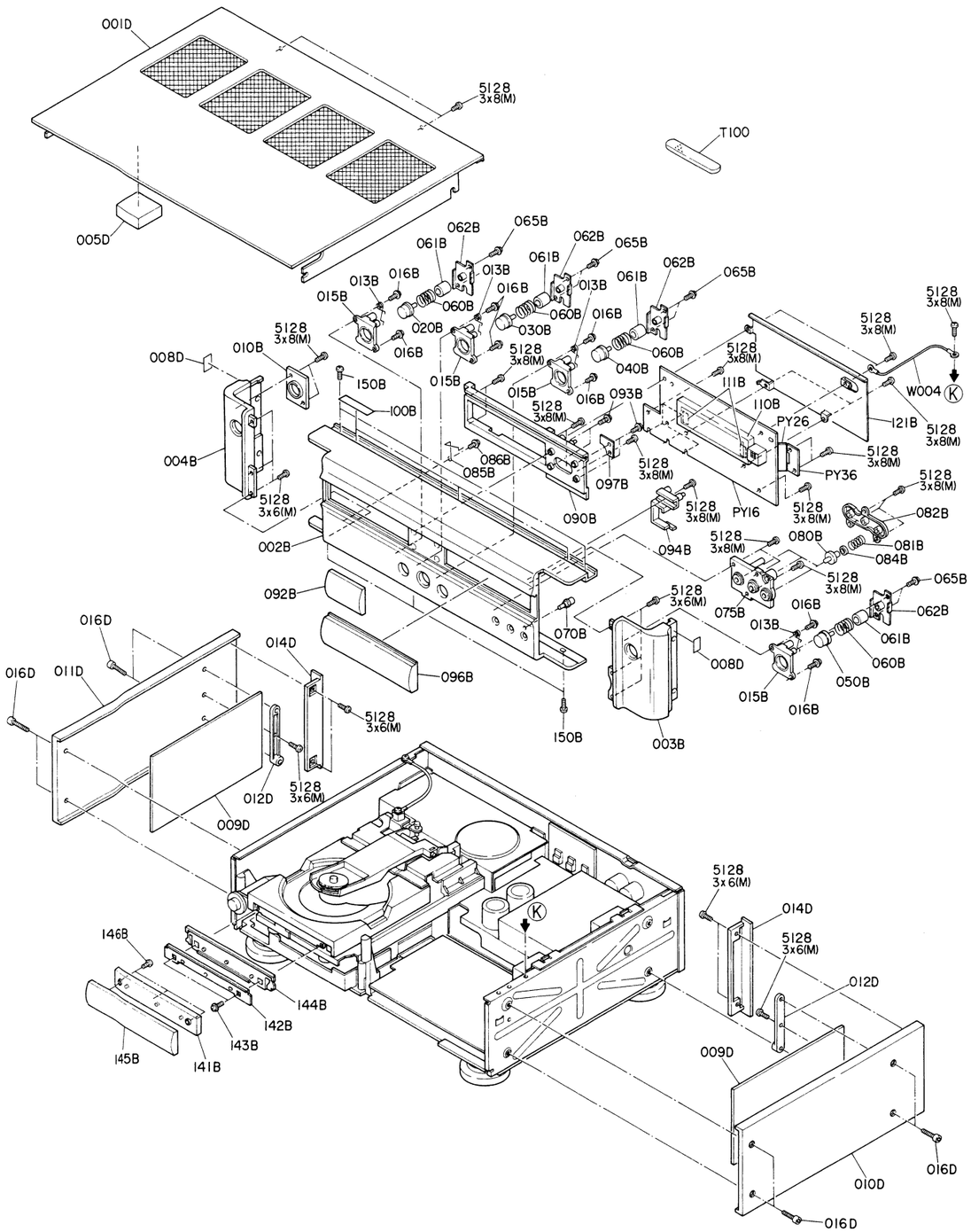
SY03 OPEN/CLOSE
SY04 PREV
SY05 NEXT
SY06 PAUSE
SY07 PLAY
SY08 DISPLAY OFF
SY09 STOP
JY03 SERVICE MODE

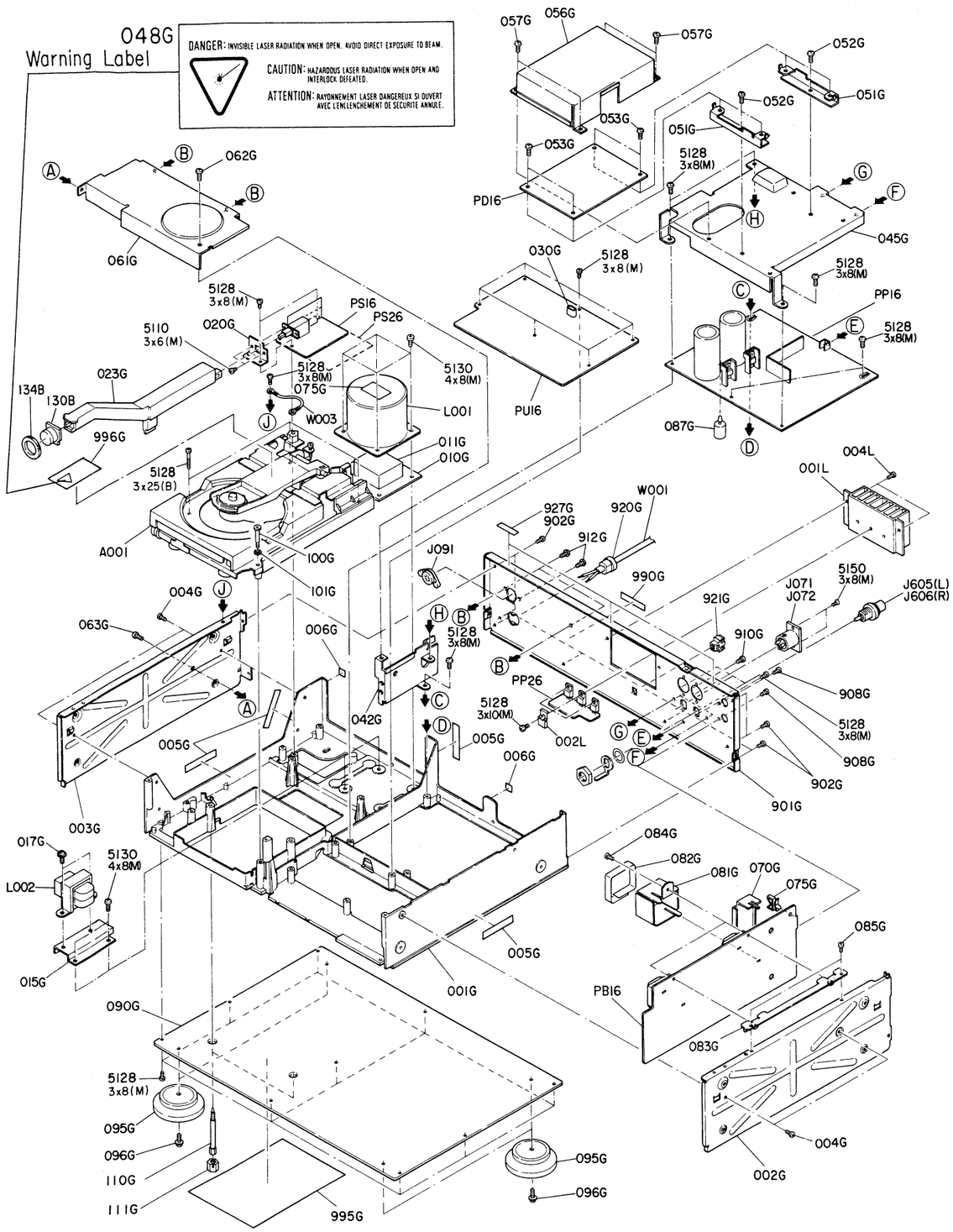
QY51 DTA114TS
QY52 2SA605SP
QY53 2SD1862
QY82 DTA114TS
QY81 PST5230
QY84 2SA605SP
QY83 DTC114ES

ZY01 PAS-C0615

JF04
JF01
TO CONTROL/DECODER(PU16)

7. EXPLODED VIEW AND MECHANISM PARTS LIST





MECHANICAL PARTS LIST

REF. DESIG.	PART NO.	DESCRIPTION
002B	4822 444 40657	FRONT PANEL GOLD
003B	4822 454 30484	ESCUTCHEON PIECE RIGHT (GOLD)
004B	4822 454 30485	ESCUTCHEON PIECE LEFT (GOLD)
010B	4822 532 40225	BUSHING, POWER BUTTON
013B	4822 492 71359	SPRING, RETAINER(BUTTON)
015B	4822 532 40221	RETAINER BUSH, BUTTON LARGE
016B	4822 502 12511	B.T.SCREW(W/W) B3X8
020B	4822 410 62615	BUTTON ASSY, PAUSE (GOLD)
030B	4822 410 62614	BUTTON ASSY OPEN/CLOSE (GOLD)
040B	4822 410 62616	BUTTON ASSY STOP (GOLD)
050B	4822 410 62613	PLAY BUTTON ASSY (GOLD)
060B	4822 492 71357	SPRING, BUTTON LARGE
061B	4822 462 71931	BUFFER
065B	4822 502 12511	B.T.SCREW (W/W) B3X8
070B	4822 381 11417	LENS, LED, DISPLAY OFF
075B	4822 532 40222	RETAINER, FRAME FOR BUTTON SMALL
080B	4822 410 62611	BUTTON, SMALL
081B	4822 492 71358	SPRING
082B	4822 444 60917	COVER, BACK OF BUTTON SMALL
085B	4822 492 71361	SPRING
086B	4822 502 12509	B.T.SCREW (W/W) B3X6
090B	4822 444 60918	COVER, TRAY INSIDE
093B	4822 502 12512	B.T.SCREW (W/W) B3X12
094B	4822 532 40224	RETAINER, WINDOW RIGHT
096B	4822 450 62073	WINDOW, PINK SMOKE
110B	4822 256 92037	FL. HOLDER
130B	4822 410 62612	POWER BUTTON ASSY (GOLD)
134B	4822 462 71932	BUFFER
143B	4822 502 13927	F.WASHER SCREW M3X8
144B	4822 532 40223	RETAINER (GOLD)
145B	4822 454 30487	ESCUTCHEON, DRAWER (GOLD)
150B	4822 502 13636	PH.TAP.SCREW
010D	4822 444 40658	SIDE PANEL RIGHT (GOLD)
011D	4822 444 40659	SIDE PANEL LEFT (GOLD)
012D	4822 402 61503	SPACER, SIDE PANEL
014D	4822 454 30488	ESCUTCHEON, SIDE PANEL END CAP
016D	4822 502 21338	SCREW 4X20 (GOLD)
004G	4822 502 13636	PH.TAP.SCREW
023G	4822 402 61504	LINK, POWER SW
052G	4822 502 13636	PH.TAP.SCREW
057G	4822 502 13636	PH.TAP.SCREW
062G	4822 502 13636	PH.TAP.SCREW
063G	4822 502 13636	PH.TAP.SCREW
084G	4822 502 13636	PH.TAP.SCREW
085G	4822 502 13636	PH.TAP.SCREW
095G	4822 462 42031	LEG (GOLD)
096G	4822 502 21339	B.T.SCREW (W/W)
100G	4822 502 13925	SCREW
101G	4822 530 80667	WAVE WASHER
110G	4822 532 30508	SHAFT, TRANSPORT SCREW
111G	4822 462 71495	CAP, RED OF TRANSPORT SCREW
902G	4822 502 13636	PH.TAP.SCREW
908G	4822 502 13636	PH.TAP.SCREW
910G	4822 502 13636	PH.TAP.SCREW
912G	4822 502 13636	PH.TAP.SCREW
004L	4822 502 13636	PH.TAP.SCREW
J071	4822 267 31466	PLUG CANNON (L-CH)
J072	4822 267 31466	PLUG CANNON (R-CH)
J091	4822 272 10353	VOLT.SELECT. 220-240V
J100	4822 265 31069	JACK 4P
J605	4822 290 81602	TERMINAL 1P RCA PIN JACK
J606	4822 290 81602	TERMINAL 1P RCA PIN JACK
L001	4822 146 21733	POWER TRANSFORMER [/00G]

REF. DESIG.	PART NO.	DESCRIPTION
		PACKING
001T	4822 736 21735	USER MANUAL
J082	4822 321 62021	CONNECTIVE CORD RCA CABLE
J083	4822 321 22862	CONNECTIVE CORD RCA PIN 75Ω
T100	4822 218 10512	IR COMANDER RC-15CD

LASER RADIATION SAFETY

Protection of eyes from laser beam during servicing.
This set employs a laser. Therefore, be sure to carefully follow the instructions below when servicing.

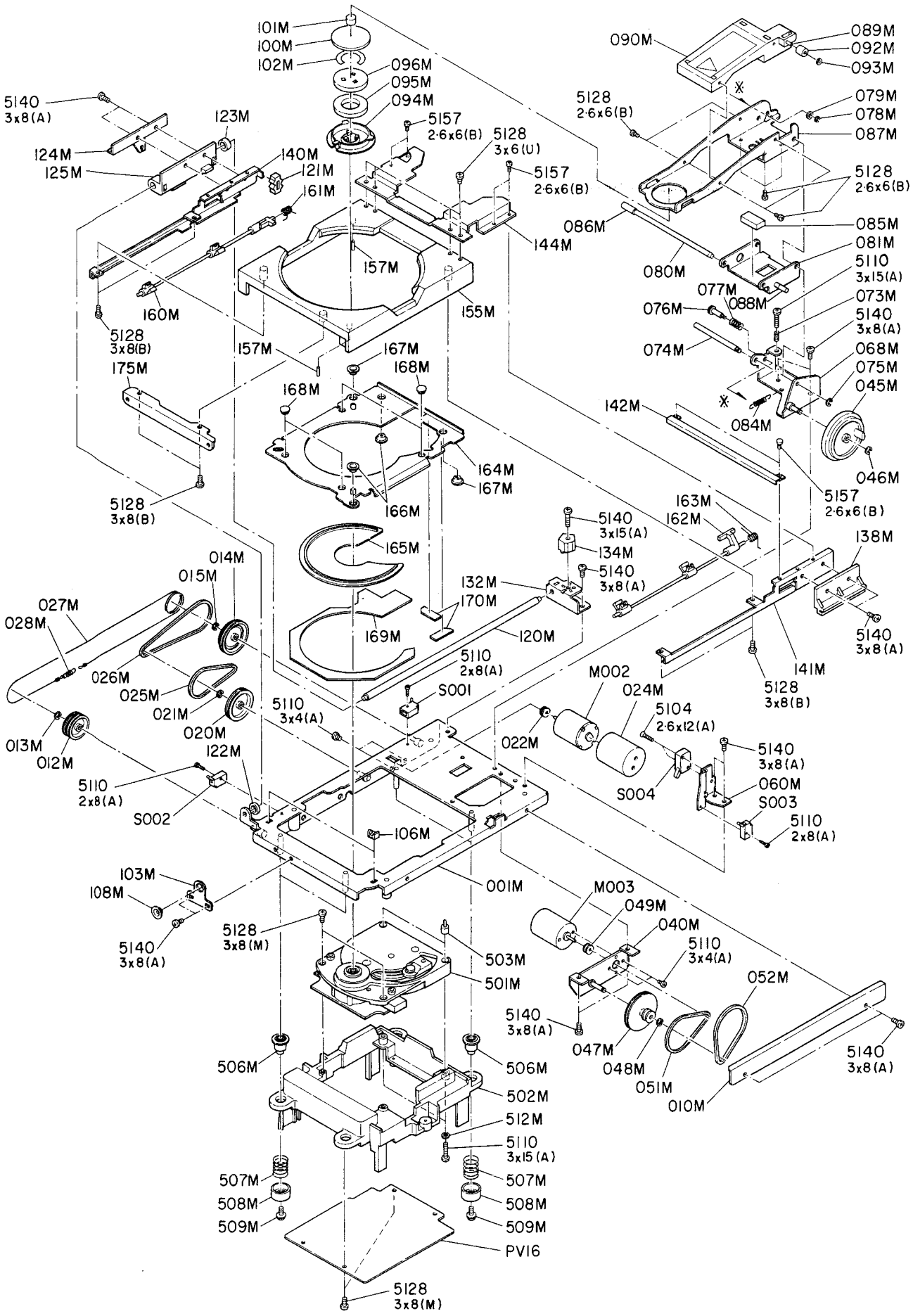
1. **Laser Diode Properties**
   - Material: Al Ga As
   - Wave Length: 0.78µm
   - Emission Duration: Continous
   - Laser Output: Max. 0.11 mW

This output is the value measures at the objective lens surface on the light pen assembly.
   - Classification: Class IIIb

2. During service, do not take the subchassis block apart and do not adjust the H F amp circuit. If there is a breakdown in the H F circuit (including laser diode), replace the entire subchassis block (including H F amp circuit board).

WARNING!!
When servicing, do not approach the laser exit with the eye too closely.
In case it is necessary to confirm laser beam emission, be sure to observe from a distance of more than 30 cm from the surface of the objective lens on the light pen assembly.

LASER WARNING LABELS
The labels shown below are affixed.
1) DHHS Protective housing label
   "DANGER – INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM."
2) DNHW Protective housing label and laser radiation sign label
   "CAUTION _ HAZARDOUS LASER RADIATION WHEN OPEN AND INTERLOCK DEFETED."
   "ATTENTION _ RAYONNEMENT LASER DANGFEREUX SI OUVERT AVEC L'ENCLENCHEMENT DE SECURITE ANNULE."


101M
100M
102M
096M
095M
094M
5157 2·6x6(B)
5128 3x6(U)
5157 2·6x6(B)
5140 3x8(A)
123M
124M
125M
140M
121M
161M
157M
144M
160M
155M
5128 3x8(B)
175M
157M
167M
168M
168M
164M
167M
166M
5128 3x8(B)
165M
169M
170M
132M
120M
5110 2x8(A)
014M
015M
027M
028M
026M
025M
021M
020M
013M
012M
5110 3x4(A)
S001
122M
5110 2x8(A)
S002
106M
001M
103M
108M
5140 3x8(A)
5128 3x8(M)
503M
501M
506M
506M
502M
512M
5110 3x15(A)
507M
508M
509M
507M
508M
509M
PV16
5128 3x8(M)
090M
089M
092M
093M
5128 2·6x6(B)
079M
078M
087M
5128 2·6x6(B)
086M
085M
080M
081M
5110 3x15(A)
077M
088M
073M
076M
5140 3x8(A)
074M
068M
075M
045M
142M
084M
046M
5157 2·6x6(B)
163M
162M
5140 3x15(A)
134M
5140 3x8(A)
138M
141M
5128 3x8(B)
5140 3x8(A)
M002
024M
5104 2·6x12(A)
022M
S004
5140 3x8(A)
060M
S003
5110 2x8(A)
M003
049M
040M
5110 3x4(A)
052M
5140 3x8(A)
047M
048M
051M
010M
5140 3x8(A)

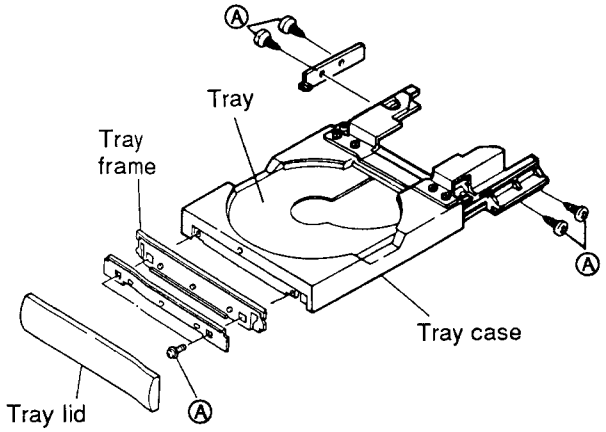
REF. DESIG.	PART NO.	DESCRIPTION
012M	4822 528 81163	PULLEY, WIRE WHEEL (F)
013M	4822 530 70043	RG RING, E FOR WHEEL (F)
014M	4822 528 81387	PULLEY, WIRE WHEEL (R)
015M	4822 530 70043	RG RING, E FOR WHEEL (R)
020M	4822 528 81238	PULLEY, MIDDLE FOR TRAY DRIVE
021M	4822 530 70043	RG RING, E FOR MIDDLE PULLEY
022M	4822 528 81166	PULLEY, MOTOR
025M	4822 358 30762	BELT, MOTOR
026M	4822 358 31065	BELT, TRAY DRIVE
027M	4822 321 30374	JOINT, WIRE ROPE
028M	4822 492 33161	SPRING, WIRE TENSION
045M	4822 528 30392	CAM, CLAMPER DRIVE
046M	4822 530 70043	RG RING, E 045M + 070M
047M	4822 528 81164	PULLEY, CLAMPER MIDDLE
048M	4822 530 70043	RG RING, E FOR MIDDLE PULLEY
051M	4822 358 30762	BELT, MOTOR
052M	4822 358 30763	BELT, CAM DRIVE
073M	4822 492 70628	SPRING, DOWN ADJUSTER
075M	4822 530 70043	RG RING, E FOR BEARING SHAFT
076M	4822 535 93105	SHAFT, L/R ADJUSTER
077M	4822 492 70631	SPRING, L/R ADJUSTER
078M	4822 530 70122	RG RING, E FOR ADJUSTER END
079M	4822 532 52236	WASHER, FOR 076M
084M	4822 492 70629	SPRING, CLAMPER PULL DOWN
088M	4822 528 90837	ROLLER
089M	4822 535 93288	SHAFT
090M	4822 256 91866	HOLDER, CLAMPER ARM
092M	4822 528 90836	ROLLER
093M	4822 532 51467	STOPPER
094M	4822 526 20174	CLAMPER, MAGNET CASE
095M	4822 526 20173	MAGNET
096M	4822 528 90783	COVER, MAGNET
100M	4822 462 71811	BUFFER, CLAMPER
101M	4822 462 71809	BUFFER
102M	4822 466 61927	BUFFER
106M	4822 256 91867	HOLDER, TRAY FRONT SUPPORT
108M	4822 532 30509	BUSHING, FRONT GUIDE
122M		BUFFER, TRAY OUT-END
125M	4822 256 91196	HOLDER, SLIDE BEARING K
138M	4822 256 91195	HOLDER, SLIDE GUIDE RIGHT
155M	4822 444 50637	CASE, TRAY (GOLD)
157M	4822 535 92576	SHAFT, TRAY GUIDE PINS
160M	4822 402 61089	LEVER, TRAY LIFT (L)
161M	4822 492 70633	SPRING, TRAY LIFT (L)
162M	4822 402 61091	LEVER, TRAY LIFT (R)
163M	4822 492 70632	SPRING, TRAY LIFT (R)
164M	4822 444 50635	TRAY, U/D DISC (BLACK)
165M	4822 444 50677	TRAY, SINGLE
166M	4822 532 11697	BUSHING, TRAY GUIDE
167M	4822 532 21323	BUSHING, TRAY GUIDE
168M	4822 532 11698	BUSHING, DISC BUFFER
501M	4822 691 30233	MECHANISM CDM-4 STEEL TURNTABLE
502M	4822 444 60906	CASE, MECHA
506M	4822 532 21452	BUSHING, SUSPENSION RUBBER
507M	4822 492 70625	SPRING, SUSPENSION
508M	4822 530 70561	RETAINER, SUSPENSION SPRING STOPPER
509M	4822 502 13926	F.WASHER SCREW, 508M + 003M
512M	4822 530 80349	SPRING, WASHER
M002	4822 361 60467	D.C.MOTOR, TRAY DRIVE
M003	4822 361 60447	D.C.MOTOR, CLAMPER DRIVE
S001	4822 277 21132	SLIDE SWITCH, TRAY IN END
S002	4822 277 21132	SLIDE SWITCH, TRAY OUT END
S003	4822 277 21132	SLIDE SWITCH, CLAMPER DOWN END
S004	4822 271 30712	MINI SWITCH, CLAMPER UP END

8. TRAY MECHANISM LOADING PROCEDURES

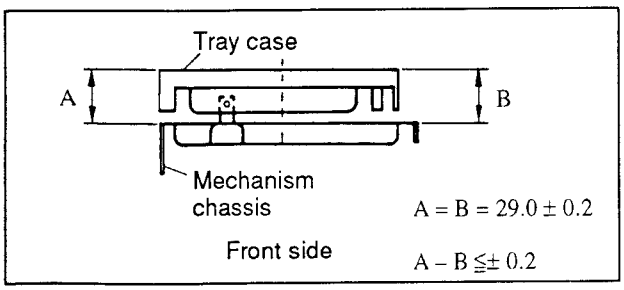
Cautions when servicing

1. **When mounting tray and tray case**
   (When replacing tray case because of damage etc.)

   a) When the tray has been positioned improperly with a deviated clearance to the front panel window, remove the tray lid, loosen screws Ⓐ and adjust by moving the tray within the range of the holes play.

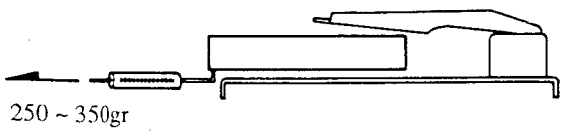


For the tray tilt adjustment, refer to the figure below.

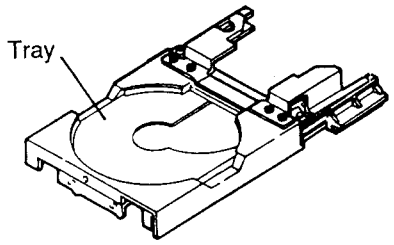


Adjust the tilt with screws Ⓐ.

b) The operating power of the tray is set to 250 - 350gr (Power OFF).



2. **When the tray is disengaged to the lower side**

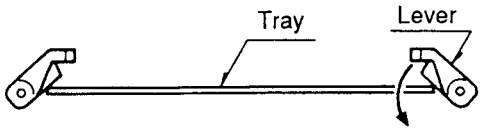


When the tray is pushed downward without the sub-chassis (CDM-4), it will be disengaged. So care will be necessary.

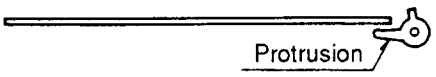
(Closing the tray without the sub-chassis also disengages the try.)

Mount the tray referring to the figures below.

a) Bring down the lever and put the tray on the protrusion of lever.



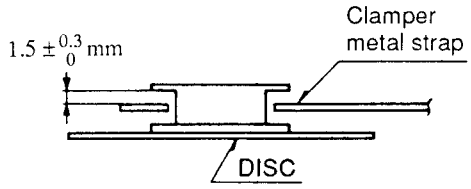
b) While holding the tray, bring down the opposite lever and put the tray on the protrusion of the lever.

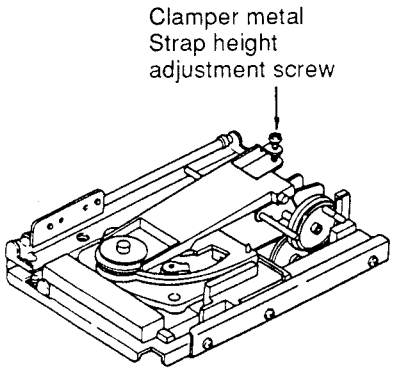


Note:
If both the levers are brought down at the same time, the tray cannot be raised. The levers should be brought down one by one.
If the tray is forced to move to the original position, the two pins injected into the tray case may be bent.

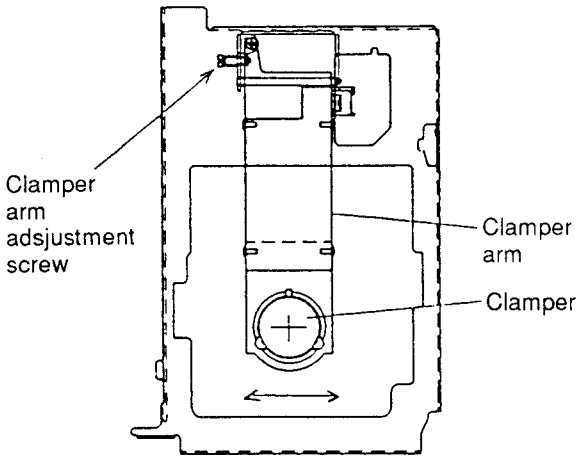
3. When replacing the sub-chassis (CDM-4)

a) The height of the sub-chassis turn table is different one by one. Adjust each turn table height so that the magnet clamper does not touch the clamper metal strap as shown in the figure.
Standard ($1.5 \pm {}^{0.3}_{0}$ mm)



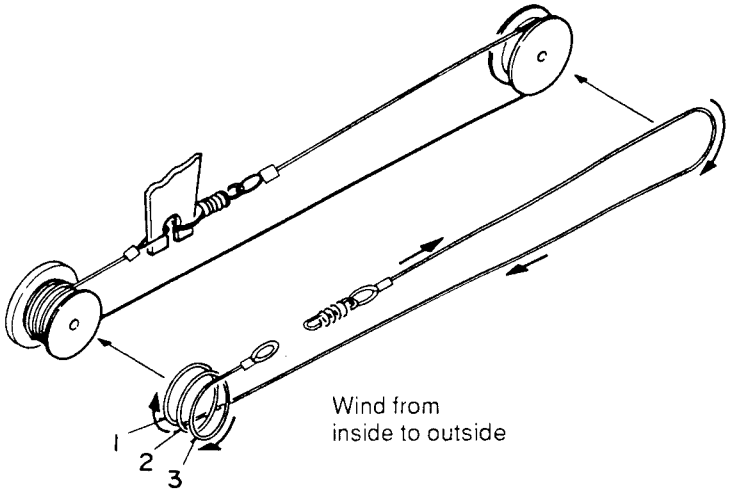


b) After replacing the sub-chassis, readjust so that the magnet clamper does not touch the clamper metal strap at right and left sides. (The clamper metal strap should not be touched to other straps.)

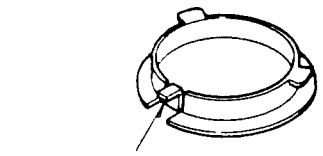


4. Others

a) For the loading wire winding, refer to the figure below.



b) When the magnet clamper (094M) is replaced, bent the narrowest tab and remove the clamper.



9. INITIATING THE SERVICE PROGRAMME

The player can be brought in service position **"0"** to **"3"** whether the disc is put on the turntable or not. For the service position **"2"**, the disc should be put on the turntable.

Service position "0"

- Make a short circuit between both ends of the terminal JY03 on the front PCB.
- Press "STOP" and "PLAY" keys simultaneously while turning the power on.
  The display shows:
  - The TRACK and INDEX field: Cd15
  - The MINUTES and SECONDS field: 00 0
- Remove the short circuit between both ends of the terminal JY03 on the front PCB.
- Quick CDM check:
  - With SEARCH keys (Remote control) " ▶▶ " and " ◀◀ " , check that the radial arm moves most outward and inward. (Service position **"0"** to **"3"**)
  - Laser control in.
  - Check that the focus unit jumps over the tracks.

ATTENTION:
After the player is brought in service position **"0"**, the laser remains driven until service position **"3"**. Therefore, avoid direct exposure to the beam in service positions **"0"**, **"1"** and **"2"**.

Service position "1"

- Bring the player in service position **"0"**.
  Press SKIP key " ▶▶| ".
- The display shows:
  - The MINUTES and SECONDS field: 00 1
- Functions:
  - Laser control in.
  - Focus start procedure is repeated unlimitedly. (If not, check SI/$\overline{RD}$ signal.)
  - With SKIP key " |◀◀ ", one can go back to service position **"0"**.

Service position "2"

- Without a disc on the turntable:
  - Bring the player in service position **"1"** with the power turned off and the disc put on the turntable.
- With a disc on the turntable:
  - With SEARCH key " |◀◀ ", move radial arm most inward.
- Bring the player in service position **"1"**.
- Press SKIP key " ▶▶| ".
- The display shows:
  - The MINUTES and SECONDS field: 00 2
- Functions:
  - Laser control in.
  - Focus control in.
  - Turntable motor control in.
  - Decoder IC generates MC signal.
  - With SKIP key " |◀◀ ", one can go back to service position **"1"**.

ATTENTION:
When the radial arm is most outward with the disc on the turntable, the turntable (spindle motor) may turn reversely at high speed. In this case, with skip key bring the player in service position **"1"** or **"3"** from **"2"** immediately.

Service position "3"

- Bring the player in service position **"2"**.
  Press SKIP key " ▶▶| ".
- The display shows:
  - The MINUTES and SECONDS field: 00 3
  - The set is the same condition as in STOP.
  - With SKIP keys " |◀◀ " and " ▶▶| ", one can go to service positions **"3"** to **"0"** and vice versa.

Service position "E"

- Bring the player in service position **"3"**.
- Without a disc on the turntable:
  - Press "PLAY" key, and the display shows the same as when the power is turned on normally.
  - Set a disc with "OPEN/CLOSE" key, and TOC data is displayed.
- With a disc on the turntable:
  - Press "PLAY" key, and TOC data is read and displayed.
- Press "PLAY" key again, and the mode is changed to PLAY.
- Functions: all keys have their original functions. (including remote controller)
- If an error is detected, the player will stop and give an error indication on the display. For a description of the error indication: See Error table.
- If the µP observes a system error, a system error indication will appear on the display: Er 01 through Er 12.
- With any key pressed, system error mode (including error message) will be cleared. (With "PLAY" key, the PLAY mode will be brought again.)
- If the µP observes an operation error, an operating error indication will be displayed for 1.5 seconds: Er 30 through Er 56.

The service programme can be abandoned again by turning the mains switch (POWER ON/OFF) off and on again (Hardware reset).

The error message number will be displayed only in service programme. (In normal mode, "ERROR" indication will just appear.)

SEARCH " ▶▶ "=Forward search key
SEARCH " ◀◀ "=Reverse search key
SKIP " ▶▶| "=TRACK NEXT key
SKIP " |◀◀ "=TRACK PREV key

10. ERROR TABLE

System errors

Indication*	Cause	Check
Er 01	No RD	Si, So, RD, Photodiode signal processor
Er 02	No $\overline{TL}$ pulse at start-up	$\overline{TL}$, HF, Photodiode signal processor, CD disc present
Er 03	No lead-in track found	CD disc, radial arm position, REdig, Radial error processor
Er 04	Too many $\overline{TL}$ pulses in PLAY	CD disc, HFD
Er 05	$\overline{TL}$ pulse > 50 msec. in PLAY	CD disc, HF in, photodiodes
Er 06	No $\overline{TL}$ pulse within 0.5 sec. during track jumping	RE-lag circuit
Er 07	Subcoding error during PLAY	HF
Er 08	TOC error	CD disc, turntable motor control, radial arm position
Er 09	EEROM sel error	Replace EEROM
Er 10	Search error; selected point on disc cannot be reached	CD disc
Er 11	ROM error	Replace ROM
Er 12	RAM in µP MC68HC11 defective	Replace µP MC68HC11

Operating errors

Er 30 " ▶▶| " key operated during the last track, with Repeat turned off.

Er 31 " |◀◀ " key operated during the first track, with Repeat turned off.

Er 32 Index selected before a track has been selected.

Er 34 The programme memory is full.

Er 35 The programme track is not present on this CD disc.

Er 36 Selected time in seconds greater than 59.

Er 38 Wrong time programmed.

Er 39 The selected track is not present on this CD disc.

Er 40 The selected track does not exist.

Er 41 FTS data storage error: memory full.

Er 42 FTS data storage error: no programme presented.

Er 43 FTS data storage error: no more disc number.

Er 44 FTS playback error: no FTS programme in the memory.

Er 45 FTS selection error: " ▶▶| " key actuated while FTS points towards end of the number of tracks.

Er 46 FTS selection error: " |◀◀ " key actuated while the FTS points to the beginning of the number of tracks.

Er 47 FTS selection error: " ▶▶| " or " |◀◀ " key actuated at the moment the µP is storing data.

Er 48 FTS selection error: " ◀◀ " key actuated while the CD disc has not yet been stored in the FTS memory; or TOC of the disc has not yet been read in.

Er 49 FTS selection error: " ▶▶ " key actuated.

Er 50 FTS clear error: "CANCEL" key actuated while data are being stored in the memory.

Er 51 "CANCEL" key actuated, but clear function has not been carried out.

Er 52 FTS data storage error: TOC of the CD disc, of which data should be saved, has not yet been read in.

Er 53 FTS playback error: Insufficient data of the TOC of the CD disc read in for processing in the FTS memory.

Er 54 "A – B" key actuated while the player was not in PLAY mode.

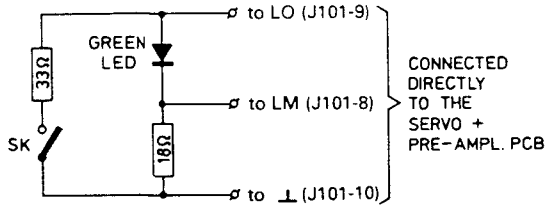
Er 55 "SEARCH" key actuated during Skip mode.

Er 56 End of the "FAST FORWARD or FAST REVERSE" search motion.

11. MEASUREMENTS AND ADJUSTMENT FOR CDM4 (SUB CHASSIS)

Check of the laser supply

The laser circuit generates a laser beam with LO signal at pin 17 of Q101, and the monitor diode makes LM signal. These circuits constitutes a feedback system and controls the laser output.
If, in that case, the laser (= complete CDM unit) is replaced, the new laser will also become defective.
However, it is impossible to check and repair a feedback system if a link is missing. For this reason the laser supply can be checked with the circuit below. The green LED replaces the laser, the voltage across the 18-Ohm resistor is fed back as monitor voltage, the 33-Ohm resistor and the switch serve to draw more current from the laser supply.



LED GREEN e.g. COY 94 IV 5322 130 32182

The above circuit is connected to connector J101 via an extension cable instead of flex print. The normal flex print is not suited for this purpose because of its high internal resistance.

Code no. extension cable 4622 322 40066

- The above flex print out of connector J101 on the servo + pre-amplifier PCB.
- Connect the circuit via the extension cable to connector J101.
- Select the play mode and SI/$\overline{RD}$ (pin 6 of Q101) will be "high".
- Measure the voltage LO (Laser Out) at test point 11.
  Note:
  SI/$\overline{RD}$ = 0, start initialization "high", is the play mode. At SI/$\overline{RD}$: "low", in the STANDBY state, LO = 0 V ± 0.2 V.

  SK open: 1.8 V < LO < 2.3 V
  170 mV < LM < 220 mV
  The green LED emits little light.
  SK closed: 1.8 V < LO < 2.3 V
  170 mV < LM < 220 mV
  The green LED emits little light.

- During the change-over from SK closed to SK open, the LED will emit more light for a short moment.
- The control sees to it that the same amount of current flows through the LED when SK is open and when SK is closed.

Repair procedure

Since laser, monitor diode and photodiodes are very sensitive to static charges, care should be taken that during measurements and adjustments the aids and yourself have a potential that is equal to that of the CD mechanism.

Laser adjustment for CDM4

- Measure the resistance of R108 + R134 with an ohmmeter and adjust potentiometer R134 so that R134 + R108 have a combined value of 1 kΩ.
- Check the monitor diode connections. Measure at test point 11 and ground (⊥).
- Put test disc **"5"** on the turn table.
- Switch on the set and select the PLAY mode or a similar service position.
- Take a DC voltmeter and measure across R116.
  The voltage across this resistor should **stay smaller than 1260 mV.**
- Check if HF is present. If not, stop the measurement immediately and analyze the fault.
- If HF is present, play track no. 1 of test disc "5" and adjust R134 (4.7 k) so that the sum of HF across R114 (test points 1 and 2) becomes 50 mV ± 2 mV with a DC voltmeter.
  Check, during the adjustment, that the voltage across R116 does not exceed 1260 mV.(J106)
- If the adjustment is not successful within the 1260 mV margin across R116, check the angle setting.

Adjustment of the focus off-set (FE-lag)

- **Coarse adjustment**

A - Place potentiometer R136 approximately in mid-position.
- Put test disc **"5"** on the turntable.
- Bring the player in service position **"2"**.
- The focussing motor can now start focussing. Check that the disc is moving.

B - Place with potentiometer R136 (Focus Offset) the focussing motor in optical horizontal position.
- Hereafter the fine adjustment of the focus offset has to be carried out.

- **Fine adjustment**

- Bring the player in service position **"2"**.
- Adjust potentiometer R106 (Focus Offset) for a voltage across R106 (test point 27) of 400 mV ± 40 mV.

Note:
Notice that CDM is in a horizontal position.

12. ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTOR

R***: (1) GD05---140, Carbon film fixed resistor, ±5%, 1/4W
R***: (2) GD05---160, Carbon film fixed resistor, ±5%, 1/6W

① — Resistance value

Examples

① Resistance value

0.1Ω ... 001	10Ω ... 100	1kΩ ... 102	100kΩ ... 104
0.5Ω ... 005	18Ω ... 180	2.7kΩ ... 272	680kΩ ... 684
1Ω ... 010	100Ω ... 101	10kΩ ... 103	1MΩ ... 105
6.8Ω ... 068	390Ω ... 391	22kΩ ... 223	4.7MΩ ... 475

(Note) Please distinguish 1/4W from 1/6W by the shape of parts used actually.

C***: CERAMIC CAP.
(1) DD1 ----370, Ceramic condenser
Disc type
①② Temp. coeff. P350 — N1000, 50V
① — Capacity value
② — Tolerance

Examples

① Tolerance (Capacity deviation)
±0.25pF ... 0
±0.5pF ... 1
±5% ... 5

* Tolerance of COMMON PARTS handled here are as follows.
0.5pF ~ 5pF ... ±0.25pF
6pF ~ 10pF ... ±0.5pF
12pF ~ 560pF ... ±5pF

② Capacity value

0.5pF ... 005	3pF ... 030	100pF ... 101
1pF ... 010	10pF ... 100	220pF ... 221
1.5pF ... 015	47pF ... 470	560pF ... 561

C***: CERAMIC CAP.
(1) DK16---300, High dielectric constant ceramic condenser
Disc type
① Temp. chara. 2B4, 50V
① — Capacity value

Examples

② Capacity value

100pF ... 101	1000pF ... 102	10000pF ... 103
470pF ... 471	2200pF ... 222	

C***: ELECTROLY CAP. (⧧), FILM CAP. (⇌)
(1) EA-------10, Electrolytic condenser
One-way lead type, Tolerance ±20%
①② — Dielectric strength
① — Capacity value

Examples

① Capacity value

0.1μF ... 104	4.7μF ... 475	100μF ... 107
0.33μF ... 334	10μF ... 106	330μF ... 337
1μF ... 105	22μF ... 226	1100μF ... 108
		2200μF ... 228

② Working voltage

6.3V ... 006	25V ... 025
10V ... 010	35V ... 035
16V ... 016	50V ... 050

(2) DF15--- 350, Plastic film condenser
One-way type, Mylar ±5% 50V
① — Capacity value

Examples

① Capacity value

0.001μF (1000pF) .. 102	0.1μF ... 104
0.0018μF 182	0.56μF ... 564
0.01μF 103	1μF ... 105
0.015μF 153	

REF. DESIG.	PART NO.	DESCRIPTION
		PB16-BALANCE OUT AND DIGITAL OUT CIRCUIT BOARD
		PB16-CAPACITORS
CT01	4822 124 41539	ELECT 47μF 16V
CT02	4822 122 30103	CERAMIC 0.022μF +80%-20% 50V
CT05	4822 122 30103	CERAMIC 0.022μF +80%-20% 50V
CT06	4822 122 30103	CERAMIC 0.022μF +80%-20% 50V
CT07	4822 122 40617	CERAMIC 0.1μF +80 -20%
CT08	4822 124 22571	ELECT 10μF 50V
CT09	4822 122 40617	CERAMIC 0.1μF 50V
CT11	4822 124 22571	ELECT 10μF 50V
C701 ~ C704	4822 124 90386	ELECT 10μF 25V
C705	4822 121 51208	FILM 1000PF ± 2% 100V
C706	4822 121 51208	FILM 1000PF ± 2% 100V
C707	4822 124 22238	ELECT 100μF 25V
C708	4822 124 22238	ELECT 100μF 25V
C717	4822 121 51209	FILM 0.015μF ± 2% 100V
C718	4822 121 51209	FILM 0.015μF ± 2% 100V
C731 ~ C734	4822 124 22572	ELECT 100μF 63V
C737	4822 124 22736	ELECT 1000μF 25V
C738	4822 124 22736	ELECT 1000μF 25V
		PB16-RESISTORS
R701	4822 116 53394	8.25KΩ ± 2% 1/4W
R702	4822 116 53394	8.25KΩ ± 2% 1/4W
R703	4822 050 24642	4.64KΩ ± 2% 1/4W
R704	4822 050 24642	4.64KΩ ± 2% 1/4W
R705	4822 050 25622	5.62KΩ ± 2% 1/4W
R706	4822 050 25622	5.62KΩ ± 2% 1/4W
R707	4822 050 21543	15.4KΩ ± 2% 1/4W
R708	4822 050 21543	15.4KΩ ± 2% 1/4W
R709	4822 050 21002	1KΩ ± 2% 1/4W
R710	4822 050 21002	1KΩ ± 2% 1/4W
R711 ~ R714	4822 050 25622	5.62KΩ ± 2% 1/4W
R715 ~ R718	4822 050 25621	562Ω ± 2% 1/4W
R719	4822 050 26812	68.1KΩ ± 2% 1/4W
R720	4822 050 26812	68.1KΩ ± 2% 1/4W
⚠ R731 ~ ⚠ R734	4822 111 90731	47Ω ± 2% 1/4W, FUSE
R737	4822 050 25622	5.62KΩ ± 2% 1/4W
R738	4822 050 25622	5.62KΩ ± 2% 1/4W
		PB16-SEMICONDUCTORS
D703	4822 130 33305	DIODE 1SS176,MA165,1SS254 30V 0.1A
QT01	4822 209 72503	IC, HI-SPEED 74HC04
Q701 ~ Q704	4822 209 70226	IC NJM5534D
		PB16-MISCELLANEOUS
JT02	4822 290 81601	TERMINAL1P RCA PIN JACK GOLD
JT04	4822 290 81601	TERMINAL1P RCA PIN JACK GOLD
LT01	4822 158 60605	FERRITE CORE
LT02	4822 142 60388	PULSE TRANSFORMER
LT03	4822 142 60388	PULSE TRANSFORMER
L701	4822 148 80787	OUTPUT TRANSFORMER L
L702	4822 148 80787	OUTPUT TRANSFORMER R
L703	4822 280 20448	RELAY DC9V RA-9W-K FOR MUTING

REF. DESIG.	PART NO.	DESCRIPTION
L705 ~ L708	4822 158 60605	FERRITE CORE
		PD16-DAC CIRCUIT BOARD
		PD16-CAPACITORS
CD01 ~ CD08	4822 126 12061	CERAMIC 0.1µF ± 10% 25V
CD09	4822 123 30363	MICA 820PF ± 5%, CHIP
CD10	4822 123 30363	MICA 820PF ± 5%, CHIP
CD11 ~ CD14	4822 123 30359	MICA 220PF ± 5%, CHIP 100WV
CD19 ~ CD22	4822 123 30359	MICA 220PF ± 5%, CHIP 100WV
CD23	4822 123 30363	MICA 820PF ± 5%, CHIP
CD24	4822 123 30363	MICA 820PF ± 5%, CHIP
CD25 ~ CD34	4822 126 12061	CERAMIC 0.1µF ± 10% 25V
CD51 ~ CD54	4822 126 12061	CERAMIC 0.1µF ± 10% 25V
CD61 ~ CD64	4822 124 90353	ELECT 100µF 10V
CD65 ~ CD68	4822 124 90363	ELECT 220µF 10V
C578	4822 122 32669	CERAMIC 0.047PF +80%-20%
C601 ~ C603	4822 123 30361	MICA 56PF ± 5%, CHIP 500WV
C604	4822 123 30361	MICA 56PF ± 5%, CHIP 500WV
C605	4822 123 30387	MICA 2200PF ± 5%, CHIP
C606	4822 123 30387	MICA 2200PF ± 5%, CHIP
C607	4822 123 30362	MICA 2200PF ± 5%, CHIP
C608	4822 123 30362	MICA 2200PF ± 5%, CHIP
C611 ~ C618	4822 124 22238	ELECT 100µF 25V
C621 ~ C628	5322 122 32654	CERAMIC 0.022µF ± 10%
		PD16-RESISTORS
RD01 ~ RD04	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
RD05	4822 111 91369	1.5KΩ ± 5% 1/10W, CHIP
RD06	4822 111 91369	1.5KΩ ± 5% 1/10W, CHIP
RD07	4822 116 83255	3.3KΩ ± 1% 1/10W, CHIP
RD08	4822 116 83255	3.3KΩ ± 1% 1/10W, CHIP
RD09	4822 116 83352	560Ω ± 5% 1/10W, CHIP
RD10	4822 116 83352	560Ω ± 5% 1/10W, CHIP
RD11	4822 116 83255	3.3KΩ ± 1% 1/10W, CHIP
RD12	4822 116 83255	3.3KΩ ± 1% 1/10W, CHIP
RD13 ~ RD16	4822 111 91355	13KΩ ± 1% 1/10W, CHIP
RD17 ~ RD20	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
RD21 ~ RD24	4822 111 91355	13KΩ ± 1% 1/10W, CHIP
RD25	4822 116 83255	3.3KΩ ± 1% 1/10W, CHIP

REF. DESIG.	PART NO.	DESCRIPTION
RD26	4822 116 83255	3.3KΩ ± 1% 1/10W, CHIP
RD27 ~ RD30	4822 116 83352	560Ω ± 5% 1/10W, CHIP
RD31	4822 116 83255	3.3KΩ ± 5% 1/10W, CHIP
RD32	4822 116 83255	3.3KΩ ± 5% 1/10W, CHIP
RD33 ~ RD38	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
R590	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
R601	4822 111 90883	10KΩ ± 1% 1/10W, CHIP
R602	4822 111 90883	10KΩ ± 1% 1/10W, CHIP
R603 ~ R606	4822 116 83255	3.3KΩ ± 1% 1/10W, CHIP
R607	4822 111 90883	10KΩ ± 1% 1/10W, CHIP
R608	4822 111 90883	10KΩ ± 1% 1/10W, CHIP
R609 ~ R612	4822 116 83255	3.3KΩ ± 1% 1/10W, CHIP
R613 ~ R620	4822 111 90883	10KΩ ± 1% 1/10W, CHIP
R621 ~ R624	4822 111 91366	5.6KΩ ± 1% 1/10W, CHIP
R625 ~ R628	4822 117 10183	2.61KΩ ± 1% 1/10W, CHIP
R629 ~ R636	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
R639	4822 111 90892	0Ω ± 5% 1/10W, CHIP
R640	4822 111 90892	0Ω ± 5% 1/10W, CHIP
		PD16-SEMICONDUCTORS
QD01	4822 209 31355	IC TDA1547 ★
QD02	4822 209 31355	IC TDA1547 ★
Q568	4822 209 31423	IC TC7W04F
Q571	4822 209 61494	IC 74HC74
Q601	4822 209 31153	IC, OP-AMP NJM2114D
Q602	4822 209 31153	IC, OP-AMP NJM2114D
Q603 ~ Q606	4822 209 30062	IC NJM5534M
		PD16-MISCELLANEOUS
L601	4822 157 53873	100 µH
L602	4822 157 53873	100 µH
		PP16-POWER/AUDIO CIRCUIT BOARD
		PP16-CAPACITORS
CN01	4822 124 90357	ELECT 2.2µF 50V
C653 ~ C656	4822 124 80123	ELECT 220µF 16V
C657 ~ C660	4822 124 23649	ELECT 470µF 25V
C665	4822 123 30089	MICA 22PF ± 5% 500V
C666	4822 123 30089	MICA 22PF ± 5% 500V
C830	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
C834	4822 124 22239	ELECT 3300µF 25V
C835	4822 124 22239	ELECT 3300µF 25V
C836	4822 124 90364	ELECT 220µF 16V
C837	4822 124 90364	ELECT 220µF 16V

REF. DESIG.	PART NO.	DESCRIPTION
C838	4822 124 23649	ELECT 470µF 25V
C840	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
C842	4822 124 80582	ELECT 4700µF 16V
C845	4822 124 90364	ELECT 220µF 16V
C850	4822 121 20263	COMP. 0.47µF +6.8Ω
C853	4822 124 42037	ELECT 6800µF 35V
C854	4822 124 42037	ELECT 6800µF 35V
C855	4822 124 23364	ELECT 47µF 50V
C856	4822 124 23364	ELECT 47µF 50V
C857	4822 124 22734	ELECT 470µF 25V
C858	4822 124 22734	ELECT 470µF 25V
C863	4822 124 23363	ELECT 220µF 6.3V
C864	4822 124 23364	ELECT 47µF 50V
C872	4822 124 23364	ELECT 47µF 50V
C873	4822 124 23363	ELECT 220µF 6.3V
		PP16-RESISTORS
R653	4822 050 21002	1KΩ ± 2% 1/4W
R654	4822 050 21002	1KΩ ± 2% 1/4W
R655	4822 050 21004	100KΩ ± 2% 1/4W
R656	4822 050 21004	100KΩ ± 2% 1/4W
R659	4822 050 21001	100Ω ± 2% 1/4W
R660	4822 050 21001	100Ω ± 2% 1/4W
R663	4822 050 21004	100KΩ ± 2% 1/4W
R664	4822 050 21004	100KΩ ± 2% 1/4W
R665	4822 050 23323	33.2KΩ ± 2% 1/4W
R666	4822 050 23323	33.2KΩ ± 2% 1/4W
R667 ~ R670	4822 050 12749	27.4Ω ± 2% 1/4W
⚠ R691 ~ ⚠ R694	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
R801	4822 117 10229	6.81KΩ ± 2% 1/4W
R802	4822 117 10229	6.81KΩ ± 2% 1/4W
R803 ~ R806	4822 050 21782	1.78KΩ ± 2% 1/4W
R807	4822 050 21212	1.21KΩ ± 2% 1/4W
R808	4822 050 21212	1.21KΩ ± 2% 1/4W
R809	4822 050 21782	1.78KΩ ± 2% 1/4W
R810	4822 050 21782	1.78KΩ ± 2% 1/4W
R811	4822 050 21212	1.21KΩ ± 2% 1/4W
R812	4822 050 21212	1.21KΩ ± 2% 1/4W
⚠ R813	4822 111 90967	4.7Ω 1/4W, FUSE
⚠ R814	482? 111 90967	4.7Ω 1/4W, FUSE
R862	4822 050 21002	1KΩ ± 2% 1/4W
R863	4822 050 21002	1KΩ ± 2% 1/4W
R864	4822 050 21782	1.78KΩ ± 2% 1/4W
R866	4822 050 21212	1.21KΩ ± 2% 1/4W
R867	4822 050 25621	562Ω ± 2% 1/4W
R872	4822 050 25621	562Ω ± 2% 1/4W
R873	4822 050 21002	1KΩ ± 2% 1/4W
R874	4822 050 21212	1.21KΩ ± 2% 1/4W
R875	4822 050 21002	1KΩ ± 2% 1/4W
R876	4822 050 21782	1.78KΩ ± 2% 1/4W
		PP16-SEMICONDUCTORS
D651	4822 130 33305	DIODE 1SS176, MA165, 1SS254 30V 0.1A
⚠ D831 ~ ⚠ D844	4822 130 32508	DIODE RL103E/DSF10C
⚠ D851 ~ ⚠ D854	4822 130 33074	DIODE 30DF-2 200V 3A
D855	4822 130 33664	ZENER DIODE HZ6L(3) 6.2V
D856	4822 130 33664	ZENER DIODE HZ6L(3) 6.2V
D861	4822 130 82956	ZENER DIODE HZ2CLL 2.4V
D871	4822 130 82956	ZENER DIODE HZ2CLL 2.4V

REF. DESIG.	PART NO.	DESCRIPTION
D872	4822 130 33759	ZENER DIODE 04AZ4.7ES, MTZJ4.7B, RD4.7ES
QN01	4822 209 83312	IC, RELAY DRIVE TA7317P
Q651	5322 130 41844	F.E.T. 2SK170 BL VGDS=-40V PD=0.4V
Q652	5322 130 41844	F.E.T. 2SK170 BL VGDS=-40V PD=0.4V
Q653	4822 130 62649	F.E.T. 2SJ74 BL VGDS=25V PD=24W
Q654	4822 130 62649	F.E.T. 2SJ74 BL VGDS=25V PD=24W
Q655	4822 209 32385	AMP MODULE
Q656	4822 209 32385	AMP MODULE
⚠ Q851	4822 130 43023	TRANSISTOR 2SA1306 (O, Y)
⚠ Q852	4822 130 43311	TRANSISTOR 2SC3298 (O, Y)
⚠ Q853	4822 130 60107	TRANSISTOR 2SA1048 (Y, GR)
⚠ Q854	4822 130 60839	TRANSISTOR 2SC2458 (Y, GR)
Q855	4822 130 60107	TRANSISTOR 2SA1048 (Y, GR)
Q856	4822 130 60839	TRANSISTOR 2SC2458 (Y, GR)
⚠ Q861	4822 130 43311	TRANSISTOR 2SC3298 (O, Y)
Q862 ~ Q864	4822 130 60839	TRANSISTOR 2SC2458 (Y, GR)
⚠ Q871	4822 130 43023	TRANSISTOR 2SA1306 (O, Y)
Q872	4822 130 60107	TRANSISTOR 2SA1048 (Y, GR)
Q873	4822 130 60107	TRANSISTOR 2SA1048 (Y, GR)
		PP16-MISCELLANEOUS
⚠ F831	4822 253 30402	FUSE T 800MA.BS.SEMKO.ETC
⚠ F832	4822 253 30402	FUSE 800MA.BS.SEMKO.ETC
⚠ F841	4822 070 31002	FUSE 1A 250V
⚠ F851	4822 253 30402	FUSE T 800MA.BS.SEMKO.ETC
⚠ F852	4822 253 30402	FUSE T 800MA.BS.SEMKO.ETC
⚠ J831	4822 256 30329	JACK, FUSE HOLDER
⚠ J832	4822 267 30978	JACK, FUSE HOLDER
⚠ J833	4822 256 30329	JACK, FUSE HOLDER
⚠ J834	4822 267 30978	JACK, FUSE HOLDER
⚠ J841	4822 256 30329	JACK, FUSE HOLDER
⚠ J842	4822 267 30978	JACK, FUSE HOLDER
⚠ J851	4822 256 30329	JACK, FUSE HOLDER
⚠ J852	4822 267 30978	JACK, FUSE HOLDER
⚠ J853	4822 256 30329	JACK, FUSE HOLDER
⚠ J854	4822 267 30978	JACK, FUSE HOLDER
L651	4822 280 20448	RELAY DC9V RA-9W-K FOR MUTING
L653	4822 158 60605	FERITE CORE
L654	4822 158 60605	FERITE CORE
		PP26-REGULATOR CIRCUIT BOARD
		PP26-SEMICONDUCTORS
⚠ Q831	4822 209 62762	IC, REG NJN7909FA -9V 1A
⚠ Q832	4822 209 62761	IC, REG NJM7809FA +9V 1A
⚠ Q841	4822 209 31631	IC, REG NJM7805FA +5V 1A
		PS26-POWER SW CIRCUIT BOARD
		PS26-CAPACITOR
GH02	4822 121 43732	FILM 0.01µF ± 20% 250V
		PS26-MISCELLANEOUS
LH01	4822 157 70419	LF-4D-102
SH02	4822 276 11141	PUSH SWITCH, POWER SW

REF. DESIG.	PART NO.	DESCRIPTION
		PU16 -µ-COM AND DECODER CIRCUIT BOARD
		PU16-CAPACITORS
CF03	4822 124 22274	ELECT 4.7µF 50V
CF04	4822 124 41539	ELECT 47µF 16V
CF05	5322 122 32654	CERAMIC 0.022µF ± 10%
CF06	5322 122 32654	CERAMIC 0.022µF ± 10%
CF07	4822 124 41539	ELECT 47µF 16V
CF08	5322 122 32654	CERAMIC 0.022µF ± 10%
CF09	4822 124 41539	ELECT 47µF 16V
CF10	5322 122 32654	CERAMIC 0.022µF ± 10%
CF13	4822 124 41539	ELECT 47µF 16V
CF14	5322 122 32654	CERAMIC 0.022µF ± 10%
CF17 ~ CF19	4822 122 32669	CERAMIC 0.047µF +80%-20%
CF20	5322 122 32654	CERAMIC 0.022µF ± 10%
CF21	5322 122 32654	CERAMIC 0.022µF ± 10%
CF50	4822 122 32669	CERAMIC 0.047µF +80%-20%
CM01	4822 124 22274	ELECT 4.7µF 50V
CM04	5322 122 34098	CERAMIC 0.01µF ± 10%
CM05	5322 122 34098	CERAMIC 0.01µF ± 10%
CM07	4822 122 33714	CERAMIC 0.1µF +80%-20%
CM08	4822 122 33714	CERAMIC 0.1µF +80%-20%
CM09	5322 122 32654	CERAMIC 0.022µF ± 10%
C154	4822 122 32669	CERAMIC 0.047µF +80%-20%
C155	4822 122 32669	CERAMIC 0.047µF +80%-20%
C156	4822 124 41539	ELECT 47µF 16V
C157	4822 124 41539	ELECT 47µF 16V
C501	5322 122 32452	CERAMIC 47PF ± 5%
C502	4822 122 33127	CERAMIC 2200PF ± 10%
C504	4822 124 90357	ELECT 2.2µF 50V
C506	5322 122 32654	CERAMIC 0.022µF ± 10%
C514	4822 122 32669	CERAMIC 0.047µF +80%-20%
C515	4822 124 22274	ELECT 4.7µF 50V
C521	4822 124 41539	ELECT 47µF 16V
C522	4822 122 32669	CERAMIC 0.047µF +80%-20%
C523	4822 124 41539	ELECT 47µF 16V
C524	4822 122 32669	CERAMIC 0.047µF +80%-20%
C525	4822 122 32669	CERAMIC 0.047µF +80%-20%
C526	5322 122 32654	CERAMIC 0.022µF ± 10%
C527	4822 122 32669	CERAMIC 0.047µF +80%-20%
C531	5322 122 32654	CERAMIC 0.022µF ± 10%
C532	5322 122 32654	CERAMIC 0.022µF ± 10%
C561	4822 122 32669	CERAMIC 0.047PF +80%-20%
C562	4822 124 41539	ELECT 47µF 16V
C563	4822 126 12731	CERAMIC 5PF ± 0.25PF
C564	4822 126 12731	CERAMIC 5PF ± 0.25PF
C565	4822 124 41539	ELECT 47µF 16V
C566	4822 122 32669	CERAMIC 0.047PF +80%-20%
C568	4822 122 32669	CERAMIC 0.047PF +80%-20%
C569	4822 122 32669	CERAMIC 0.047PF +80%-20%
C570	5322 122 32531	CERAMIC 100PF ± 5%
C571	5322 122 32531	CERAMIC 100PF ± 5%
C572	4822 122 32669	CERAMIC 0.047PF +80%-20%
C573	5322 122 32654	CERAMIC 0.022µF ± 10%
C574	5322 122 32531	CERAMIC 100PF ± 5%
C575	5322 122 32658	CERAMIC 22PF ± 5%
C576	5322 122 32531	CERAMIC 100PF ± 10%
		PU16-RESISTORS
RF03	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
RF04	4822 111 90907	22KΩ ± 5% 1/10W, CHIP
RF05 ~ RF07	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
RF09 ~ RF12	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
RF13	4822 111 90918	4.7KΩ ± 5% 1/10W, CHIP
RF15	4822 111 90897	1MΩ ± 5% 1/10W, CHIP
RF22	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
RF23 ~ RF25	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
RF26	4822 111 90896	100KΩ ± 5% 1/4W, CHIP
RF29	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
RF30	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
RF41 ~ RF48	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
RF49	4822 111 90919	47KΩ ± 5% 1/10W, CHIP
RF50	4822 111 90906	2.2KΩ ± 5% 1/10W, CHIP
RF51	4822 111 90896	100KΩ ± 5% 1/10W, CHIP
RF52	4822 111 90896	100KΩ ± 5% 1/10W, CHIP
RF53	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
RF55	4822 111 90892	0Ω ± 5% 1/10W, CHIP
RF99	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
RM01	4822 111 90919	47KΩ ± 5%, CHIP
RM02	4822 111 90918	4.7KΩ ± 5%, CHIP
RM03	4822 111 90918	4.7KΩ ± 5%, CHIP
RM06 ~ RM08	4822 111 90918	4.7KΩ ± 5%, CHIP
RM11	4822 111 90918	4.7KΩ ± 5% 1/10W, CHIP
R151	4822 111 90918	4.7KΩ ± 5% 1/10W, CHIP
R152	4822 111 90919	47KΩ ± 5% 1/10W, CHIP
R153	4822 111 90896	100KΩ ± 5% 1/10W, CHIP
R154	4822 111 90897	1MΩ ± 5% 1/10W, CHIP
R155	4822 111 90896	100KΩ ± 5% 1/10W, CHIP
R156	4822 116 83255	3.3KΩ ± 5% 1/10W, CHIP
R157	4822 111 90922	5.6KΩ ± 5% 1/10W, CHIP
R158	4822 111 91368	120KΩ ± 5% 1/10W, CHIP
R159	4822 116 83609	390KΩ ± 5% 1/10W, CHIP
R160	4822 111 90899	15KΩ ± 5% 1/10W, CHIP
R161	4822 111 90918	4.7KΩ ± 5% 1/10W, CHIP
R162	4822 111 90896	100KΩ ± 5% 1/10W, CHIP
R163	4822 111 90919	47KΩ ± 5% 1/10W, CHIP
R164	4822 111 91075	1.2KΩ ± 5% 1/10W, CHIP
R165	4822 111 91368	120KΩ ± 5% 1/10W, CHIP
R501	4822 111 90906	2.2KΩ ± 5% 1/10W, CHIP
R502	4822 111 90907	22KΩ ± 5% 1/10W, CHIP
R503	4822 111 90897	1MΩ ± 5% 1/10W, CHIP
R504	4822 116 81011	75Ω ± 5% 1/10W, CHIP
R505	4822 111 90916	3.9KΩ ± 5% 1/10W, CHIP
R506	4822 111 90895	10KΩ ± 5% 1/10W, CHIP
R507	4822 111 90908	220KΩ ± 5% 1/10W, CHIP
R508	4822 111 91369	1.5KΩ ± 5% 1/10W, CHIP
R509	4822 111 90894	1KΩ ± 5% 1/10W, CHIP
R520	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
R561	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
R562	4822 111 90897	1MΩ ± 5% 1/10W, CHIP
R564	4822 111 90897	1MΩ ± 5% 1/10W, CHIP
R565	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
R566	4822 111 90918	4.7KΩ ± 5% 1/10W, CHIP
R567	4822 111 90918	4.7KΩ ± 5% 1/10W, CHIP
R569	4822 111 90897	1MΩ ± 5% 1/10W, CHIP
R570	4822 111 90918	4.7KΩ ± 5% 1/10W, CHIP
R574	4822 111 90892	0Ω ± 5% 1/10W, CHIP
		PU16-SEMICONDUCTORS
DM02	4822 130 81148	DIODE IMN10, CHIP
DM03	4822 130 83401	DIODE FMP1, CHIP
DM05	4822 130 81148	DIODE IMN10, CHIP
D151	4822 130 32868	DIODE MA153, CHIP
QF01	4822 209 62768	MICROPROCESSOR MC68HC11A0P MAIN µ-COM

REF. DESIG.	PART NO.	DESCRIPTION
QF02	4822 209 62756	IC MC68HC24
QF04	4822 209 52387	IC, 128K CMOS EPROM (CD-15)
QF05	5322 209 71555	IC MB74HC373
QF06	4822 209 51273	IC, EE PROM MSM2816A
QF08	4822 209 31928	IC 74HC00
QF09	4822 209 31928	IC 74HC00
QF11	4822 209 31012	IC, RESET PST529C 4.5V LOW
QF13	4822 130 60941	DIGITAL TRANSISTOR DTA114EK
QF14	4822 130 90451	DIGITAL TRANSISTOR DTC114EK
QF15	4822 130 61437	DIGITAL TRANSISTOR DTC114YK
QF16	4822 130 61436	DIGITAL TRANSISTOR DTA114EK
QM01	4822 209 83803	IC LB1645N
QM02	4822 209 83803	IC LB1645N
QM03	4822 209 32442	IC TC7WU04F
QM04	4822 130 90449	DIGITAL TRANSISTOR DTC-144EK
QM05 ~ QM07	4822 130 60941	DIGITAL TRANSISTOR DTA114EK
QM08	4822 130 90449	DIGITAL TRANSISTOR DTC-144EK
Q151	4822 209 83357	IC NJM4560M
Q152	4822 130 42733	TRANSISTOR 2SA1162 (G), CHIP
Q153	4822 130 61799	DIGITAL TRANSISTOR DTA144TK
Q501	4822 209 63453	IC SAA7310
Q502	4822 209 73952	IC, D-RAM MB81416C-15/ MN4264P-15
Q503	4822 130 61438	TRANSISTOR 2SA1005 (L, R)
Q504	4822 209 62588	IC ADC PCF2705P
Q505	4822 209 62764	IC 74HC164F
Q507	4822 130 90451	DIGITAL TRANSISTOR DTC114EK
Q508	4822 209 32442	IC TC7WU04F
Q509	4822 209 32442	IC TC7WU04F
Q532	4822 209 31442	IC TC7W00F
Q533	4822 209 61494	IC 74HC74F
Q534	4822 209 61494	IC 74HC74F
Q561	4822 209 31356	IC, BS DAC SAA7350
Q562	4822 209 31016	MICROPROCESSOR, LC6528CH QFP
Q563	4822 209 31011	IC, DIGTAL FIL SM5803APT
Q564	4822 209 32442	IC TC7WU04F
Q565	4822 209 62764	IC 74HC164F
Q566	4822 209 62764	IC 74HC164F
Q567	5322 209 73187	IC 74HC04
Q569	4822 209 32443	IC, DSP SM5852
Q572	4822 130 90323	DIGITAL TRANSISTOR DTC114TK
Q573	4822 130 90323	DIGITAL TRANSISTOR DTC114TK
		PU16-MISCELLANEOUS
L501	4822 152 20647	CHOKE COIL 2.2µH
XF01	4822 242 72066	CERAMIC VIBRATOR CST8.00MHZ(MT)
X561	4822 242 81524	CRYSTAL 33.8688MHZ MF
X562	4822 242 72223	CERAMIC VIBRATOR CST4.00MGW
		PV16-SERVO CIRCUIT BOARD
		PV16-CAPACITORS
C101	4822 121 42327	FILM 470PF ± 5% 50V
C103	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
C110	4822 124 41539	ELECT 47µF 16V
C113	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
C114	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
C126	4822 124 41539	ELECT 47µF 16V
C128	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
C132	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
C133	4822 124 41539	ELECT 47µF 16V
C134	4822 124 41539	ELECT 47µF 16V
C135	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
C136	4822 124 41539	ELECT 47µF 16V
C137	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
C140	4822 124 41539	ELECT 47µF 16V
		PV16-RESISTORS
R116	4822 115 90194	15Ω ± 2% 1/4W, FUSE
R134	4822 100 20681	2.2KΩ TRIMMING
R136	4822 100 11352	22KΩ TRIMMING
R141	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
R146	4822 111 90967	4.7Ω ± 5% 1/4W, FUSE
		PV16-SEMICONDUCTORS
D132	4822 130 80272	ZENER DIODE 7.5V 04AZ7.5, RD7.5ES, MTZJ7.5C
D133	4822 130 80272	ZENER DIODE 7.5V 04AZ7.5, RD7.5ES, MTZJ7.5C
D134	4822 130 32508	DIODE RL103E/DSF10C
Q101	4822 209 30436	IC, HF& FOC QFP TDA8808
Q102	4822 130 61441	TRANSISTOR 2SD1862 (Q,R)
Q103	4822 209 30437	IC, RAD QFP TDA8809
Q106	4822 209 62755	IC, DUAL POWER OP AMP TCA0372
⚠ Q108	4822 209 30442	IC NJM79L06A
		PV16-MISCELLANEOUS
J101	4822 267 31465	JACK FPC CONNECT
J102	4822 267 41094	PLUG 4P
		PY16-DISPLAY AND KEY-SENS CIRCUIT BOARD
		PY16-CAPACITORS
CY01	4822 122 32486	CERAMIC 0.01µF +80%-20% 50V
CY02	4822 124 21737	ELECT 100µF 6.3V
CY04	4822 124 21894	ELECT 10µF 16V
CY05	5322 122 32265	CERAMIC 100PF ± 5% 50V
CY06	5322 122 32265	CERAMIC 100PF ± 5% 50V
CY07	4822 124 21983	ELECT 4.7µF 50V
CY11	4822 124 21737	ELECT 100µF 6.3V
CY12	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
CY13	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
CY61	4822 122 30103	CERAMIC 0.022µF +80%-20% 50V
CY62	4822 124 90365	ELECT 220µF 25V
CY63	4822 124 41536	ELECT 100µF 35V
CY81	4822 122 32678	ELECT 22µF 6.3V
CY82	4822 124 21894	ELECT 10µF 16V
CY83	4822 124 21902	ELECT 47µF 10V
		PY16-SEMICONDUCTORS
DY01	4822 130 33305	DIODE 1SS176,MA165,1SS254 30V 0.1A
DY03 ~	4822 130 33305	DIODE 1SS176,MA165,1SS254 30V 0.1A
DY05		
DY08	4822 130 33305	DIODE 1SS176,MA165,1SS254 30V 0.1A
DY09	4822 130 80319	ZENER DIODE 04AZ9.1, RD9.1ES, MTZJ9.1C
DY51	4822 130 33305	DIODE 1SS176,MA165,1SS254 30V 0.1A
DY54	4822 130 33948	ZENER DIODE 04AZ5.6-Y
DY61	4822 130 80839	DIODE S5688G VRM=400V IO=1A
DY62	4822 130 80839	DIODE S5688G VRM=400V IO=1A
DY81	4822 130 80326	L.E.D. LT3D8B RED 3O
DY82	4822 130 33305	DIODE 1SS176.MA165.1SS254
QY01	4822 209 62769	MICROPROCESSOR µPD7537A FRONT CPU

REF. DESIG.	PART NO.	DESCRIPTION
QY05	4822 209 62763	IC TC74HC164BP
QY06 ~ QY11	4822 130 63211	DIGITAL TRANSISTOR DTA114TS
QY51	4822 130 63211	DIGITAL TRANSISTOR DTA114TS
QY52	4822 130 42715	TRANSISTOR 2SA608SP, 2SA1048, 2SA1309, 2SA933S
QY53	4822 130 42298	TRANSISTOR 2SC536SP, 2SC2458, 2SC3311, 2SC1740S
QY81	4822 209 73951	IC, RESET PST523D (4.2V) LOW
QY82	4822 130 63211	DIGITAL TRANSISTOR DTA114TS
QY83	4822 130 60588	DIGITAL TRANSISTOR DTC114ES
QY84	4822 130 42715	TRANSISTOR 2SA608SP, 2SA1048, 2SA1309, 2SA933S
		PY16-MISCELLANEOUS
SY03	4822 276 13408	PUSH SWITCH
SY04	4822 276 20508	PUSH SWITCH
SY05	4822 276 20508	PUSH SWITCH
SY06	4822 276 13408	PUSH SWITCH
SY08	4822 276 20508	PUSH SWITCH
SY09	4822 276 13408	PUSH SWITCH
XY01	4822 242 73695	CERAMIC VIBRATOR CSB590P 590KHZ
ZY01	4822 130 82393	PHOTO UNIT GP1U720R 36KHZ
		PY36-DISPLAY 3 CIRCUIT BOARD
		PY36-MISCELLANEOUS
SY07	4822 276 13408	PUSH SWITCH PLAY

NOTE ON SAFETY

Symbol ⚠ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ⚠ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.